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PRINTED IN GREAT BRITAIN AT THE UNIVERSITY PRESS, OXFORD, BY VIVIAN RIDLER, PRINTER TO THE UNIVERSITY

KELMAN (A.) & PERSON (L. H.). **Strains of Pseudomonas solanacearum differing in pathogenicity to Tobacco and Peanut.**—*Phytopathology*, **51**, 3, pp. 158–161, 4 fig., 1 graph, 1961.

Isolates of *P. solanacearum* from tobacco, groundnut, tomato, eggplant, and potato from N. and S. Carol., Ga, and Fla were all similarly pathogenic to potato, tomato, and eggplant in stem inoculations at the N. Carol. agric. Exp. Sta., Raleigh [cf. **34**, 438]. Tomato isolates from Ga were less pathogenic on tobacco than were those from N. Carol. Isolates also differed in virulence to groundnuts. Potato isolates from Israel and Cyprus were highly pathogenic to tomato and eggplant but much less so to tobacco and groundnut.

ARK (P. A.) & THOMPSON (J. P.). **Detection of hairy root pathogen, Agrobacterium rhizogenes, by the use of fleshy roots.**—*Phytopathology*, **51**, 1, pp. 69–71, 7 fig., 1961.

At Dept Plant Path., Univ. Calif., Berkeley, a method was evolved for the recovery of *A. rhizogenes* [**40**, 172] from diseased plants and for its prompt identification. Roots of carrot, turnip, beetroot, parsnip, and Jerusalem artichoke were washed in a detergent solution, rinsed several times in distilled water, and dried. Slices in Petri dishes were swabbed with inoculum prepared by grinding diseased tissue (rose roots in this work) in sterile distilled water or suspending an agar culture in distilled water. A profusion of roots developed on the inoculated surfaces after incubation at room temp. Hairy root was quite distinct from crown gall (*A. tumefaciens*) [**38**, 179], and mixed cultures could be separated by subculturing from the 2 types of lesion. Hairy root could be detected 7 days after inoculation on turnip, and after 12–14 days on carrot. A culture made from apple in 1942 was still virulent.

MAYER (H.). **Beobachtungen bei der Einwirkung von Kupfer-II-Ionen und Quecksilber-II-Ionen auf Conidien von Fusarium decemcellulare. Der Synergismus von Schwermetallionen (Cu^{++}, Cd^{++}, Pb^{++}, Hg^{++}) und kolloidalem Schwefel bei der fungiciden Wirkung auf Conidien von F. decemcellulare.** [Observations on the effect of copper-II-ions and mercury-II-ions on conidia of *Calonectria rigidiuscula*. The synergism of heavy metal ions (Cu^{++}, Cd^{++}, Pb^{++}, Hg^{++}) and colloidal S in the fungicidal action on conidia of *C. rigidiuscula*.]—*Arch. Mikrobiol.*, **37**, 1, pp. 18–27, 9 fig.; pp. 28–48, 6 fig., 1960.

In further work [cf. **36**, 110 and below] at Inst. für allgemeine Botanik, Friedrich Schiller Univ., Jena, Germany, after brief action of $CuSO_4$ solution on conidia of *C. rigidiuscula* [**38**, 181] a distinct adsorption of Cu on the surface was detected. The conidial cells into which the Cu had penetrated were mostly shrivelled. $HgCl_2$ produced an accumulation of the Hg in or around the nucleus. Combinations of Cd, Cu, Pb, and Hg salts with colloidal S have a strong synergistic action. Closer examination of the synergism between Cu and S showed an accelerated toxic action of the mixture, a disturbance of the S reduction capacity of the conidia due to the Cu, and a strong penetration of the Cu due to the S. Colloidal S also promotes the penetration of Pb and Cd into the conidia, but not Hg.

TRÖGER (R.). **Weitere Studien zur Kupferaufnahme und dem Kupfernachweis bei Conidien von Fusarium decemcellulare (Brick). (Versuche mit Kupfersulfat). Zur Physiologie der Kupferwirkung auf Conidien von Fusarium decemcellulare (Brick). I, II. Mitteilung.** [Further studies on copper absorption and copper

determination in conidia of *Calonectria rigidiuscula.* (Tests with copper sulphate.) On the physiology of the action of copper on conidia of *C. rigidiuscula.* Parts I and II.]—*Arch. Mikrobiol.*, **37**, 2, pp. 134–150, 1 graph; 3, pp. 256–266, 2 fig.; 4, pp. 341–354, 3 fig., 1960.

In further work at Inst. für allgemeine Botanik, Friedrich Schiller Univ., Jena, Germany, it was demonstrated that the conidia of *C. rigidiuscula* [**40**, 397 and above] absorb a considerable quantity of metal within 5–10 sec. of being immersed in a $CuSO_4$ solution. In conidia damaged by S, urethane, or heat Cu can be determined immediately after application, while in healthy ones only after 2–3 hr. The affinity of the conidial substance for Cu is reduced by absorbed Cu and also by surface-active substances and cell poisons such as formol.

Three hr. after treatment with $CuSO_4$ the conidia released amino-acid Cu complexes into the suspension. The release was strongest 8 hr. after treatment and lasted only for a limited time. In addition to earlier mentioned amino-acids [**38**, 389] proline, methionine, tryptophane, and phenylalanine were found in the suspension. Bordeaux mixture had an effect similar to that of $CuSO_4$, but the amino-acid Cu compounds were released very soon after treatment. $Ca(OH)_2$ also causes the conidia to release amino-acids.

Cu-treated conidia release approx. $\frac{4}{5}$ of the absorbed Cu in the form of amino-acid Cu complexes. These released complexes are not harmful to 'normal' untreated conidia. Control tests with amino-acid Cu complexes confirmed this. The Cu compounds of some aliphatic carbonic acids varied in their toxicity.

Recommended analytical methods for pesticides. I. Mercury in formulated or technical products.—*F.A.O. Plant Prot. Bull.*, **9**, 2, pp. 19–28, 3 fig., 1960.

An account (covering the principle, scope, apparatus necessary, reagents, and the procedure) by the Collaborative Pesticides Analytical Committee, c/o Plant Pathology Laboratory, Harpenden, Herts, England, of the HG 1, HG 2, and HG 3 methods.

Molinas (S.). **Method for detecting fungicides on grain.**—*Cereal Sci. Today*, **6**, 3, pp. 84–86, 2 fig., 1961.

Full details are given of a non-specific agar method devised at HEW-Food and Drug Administration, Div. Microbiol., Washington 25, D.C., for the detection of fungicides on wheat, maize, and barley seeds [cf. **30**, 279, 424] and also beans [*Phaseolus vulgaris*]. The substitution of *Sarcina lutea* as a test organism for the fungi used in previous methods shortened the incubation period from 48 to 12–18 hr. It is sensitive to a number of organic fungicides including captan, thiram, and ethyl $Hg_3(PO_4)_2$. Chemicals readily detected on wheat of known treatment included canuck, drinox, setrete ($\frac{1}{2}$ and $\frac{3}{4}$ oz./bush.), panogen (same concs.), and ceresan, also arasan on maize. The results of tests on other samples are tabulated.

Kotakemori (M.). **Colorimetric determination of mercury in organic mercury fungicide by the copper diethyldithiocarbamate method.**—*Takamine Kenkyusho Nempo*, **11**, pp. 222–227, 1959. [*Chem. Abstr.*, **55**, 6, col. 5847 b, 1961.]

Phenyl Hg acetate (0·16–0·19% Hg) in compounds with a clay powder filler is easily decomposed to $HgCl_2$ by boiling with 6N HCl. Directions are given for colorimetric determination [cf. below] by this procedure. Interference by sulphides can be eliminated by 10 min. boiling of the HCl-treated solution. The error of the procedure is approx. 1%.

Iguchi (M.), Nishiyama (A.), & Nagase (Y.). **Colorimetric determination of phenylmercuric acetate with diphenylcarbazone.**—*Yakugaku Zasshi* (*J. pharm. Soc. Japan*), **80**, pp. 1437–1440, 1960. [*Chem. Abstr.*, **55**, 6, col. 5846 i, 1961.]

The method, involving the formation of a stable complex of phenyl Hg acetate

[cf. above] with alkaline diphenylcarbazone, is described. The acetate was detected in a tablet containing 1% of the compound. Halides interfered with this reaction.

KAARS SIJPESTEIJN (A.). **New developments in the systemic combat of fungal diseases of plants.**—*Tijdschr. PlZiekt.*, **67**, 1, pp. 11–20, 1961. [Dutch summ. 39 ref.]

A survey from the Inst. of Organic Chemistry, Utrecht, of recent developments [cf. **36**, 709; **38**, 566], including examples of direct fungitoxic action within the plant and inducement of increased host resistance.

PLARRE (W.). **Die Wirkung verschiedener Beizmittel bei der weissen Lupine (Lupinus albus), Gemüseerbse (Pisum sativum) und Buschbohne (Phaseolus vulgaris).** [The effect of various steeping compounds on White Lupin (*L. albus*), Pea (*P. sativum*), and Bean (*P. vulgaris*).]—*NachrBl. dtsch. PflSch-Dienst, Berl.*, N.F. **14**, 7, pp. 121–129, 1 graph, 1960. [Russ., Engl. summ.]

At the Forschungsstelle für Getreidezüchtung, Kloster Hadmersleben, Germany, seed treatment with organic-synthetic fungicides gave better results against seed- and soil-borne diseases than with universal mercurials. Captan and cerenox special were in general highly effective, the former particularly on white lupin seed in glasshouse compost soil, the latter in the open, while thiram was the next best.

KRÖLLER (E.). **Triphenyltin compounds as plant-protecting agents and the determination of the residue.**—*Dtsch. LebensmittRdsch.*, **56**, pp. 190–193, 1960. [*Chem. Abstr.*, **55**, 5, col. 4666 h, 1961.]

At the Max von Pettenkofer Institut, Berlin-Dahlem, analyses showed that the phenyl Sn compound [**40**, 399] brestan, sprayed on celery, was rapidly decomposed, no soluble Sn compounds being detectable after 45 days. Hence it is concluded that the chemical does not enter the plant sap.

DEKKER (J.). **Systemic activity of procaine hydrochloride on powdery mildew.**—*Tijdschr. PlZiekt.*, **67**, 1, pp. 25–27, 1 fig., 1961. [Dutch summ.]

At Wageningen cucumber plants could be kept free from mildew (*Erysiphe cichoracearum*) by spraying the leaves with a 1,000 p.p.m. solution of the chemical on the first 2 days after inoculation, or by pouring 50 ml. of a 0·5% solution on the soil (of a 12 cm. diam. flower pot with 3 plants) for 4 successive days after inoculation. Uptake of procaine HCl by the roots and transport to the leaves was demonstrated by paper chromatography. Sprays were effective against *E. cichoracearum* on gherkins, *E. graminis* on wheat, *E. polygoni* on beet, pea, and lupin, *Podosphaera leucotricha* on apple, and *Sphaerotheca pannosa* on rose. Phytotoxicity, in the form of necrotic spots on apple leaves and fruits and the dropping of older rose leaves, occurred when high concs. were sprayed at ca. 3-day intervals. *In vitro* 1,000 p.p.m. was inactive against all of 10 fungi and bacteria tested, the chemical being effective apparently only after penetration into the plant. Both constituents of procaine, *p*-aminobenzoic acid and diethyl-amino-ethanol, were ineffective against the pathogens.

TORGESON (D. C.). **The fungicidal activity of (aminoalkyl) pyrenes.**

TORGESON (D. C.), HENSLEY (W. H.), & LAMBRECH (J. A.). **Polyaracyclic methylmercaptoimidazolines as foliage fungicides.**—*Contr. Boyce Thompson Inst.*, **21**, 1, pp. 21–26; pp. 27–31, 1961. [8 and 18 ref.]

The most effective of the 20 pyrene compounds tested for the control of *Erysiphe polygoni* on bean (*Phaseolus vulgaris*) and *Podosphaera leucotricha* on apple, sprayed on 2 days after spore dusting, were N,N-dimethyl- and N,N-diethyl-l-pyrenemethylamine hydrochloride, both being equal to karathane, while N-

methyl-l-pyrenemethylamine was most effective against *Alternaria solani* on tomato. Fungicidal activity and phytotoxicity decreased as the N-alkyl chain lengthened. Heterocyclic amine derivatives were less toxic than lower members of the N-alkyl series. The more active compounds were markedly phytotoxic.

The most active imidazoline derivatives against *A. solani*, *P. leucotricha*, and *E. polygoni* on the hosts were the 2-(3-fluoranthenylmethylmercapto) and the 2-(9-phenanthrylmethylmercapto) imidazoline hydrochlorides. Free bases were less toxic. Anthracene, pyrene, and naphthalene derivatives were less fungicidal than those of fluoranthene and phenanthrene.

The results of slide germination tests using *A. oleracea* [*A. brassicicola*] and *Monilinia* [*Sclerotinia*] *fructicola* as test fungi are tabulated.

VAARTAJA (O.). **Selectivity of fungicidal materials in agar cultures.**—*Phytopathology*, **50**, 12, pp. 870–873, 1960.

At Canada Dept Agric. Res. Sta., Saskatoon, Sask., 43 fungicides were tested against 10 fungi. *Phytophthora cactorum* and *Pythium debaryanum* were inhibited by aureomycin at a conc. tolerated by most other spp. but were tolerant of 3 polyene antibiotics at rates which were generally inhibitory. *Trichoderma viride* was unique in being inhibited by a duramycin mixture at 20 p.p.m., as was *Rhizopus stolonifer* by 3 p.p.m. quintozene. *Pellicularia filamentosa* [*Corticium solani*] was less tolerant of B-856, C-272, captan, and dyrene and more so of the rest of the fungicides than were most other spp. *Mucor ramannianus* was inhibited by duramycin mixture, dyrene, neomycin, and thiram at concs. permitting growth of *Russula* sp. This selectivity may be of use in isolating pathogens and in biological control with fungicides tolerated by antagonistic saprophytes.

CYRAN (W.). **Landesrechtliche Regelung des Handels mit giftigen Pflanzenschutzmitteln.** [Provincial legal regulation of trade in poisonous plant protectives.]—*Dtsch. ApothZtg.*, **100**, 30, pp. 884–889, 1960.

The text of the police regulations issued by the Ministry of the Interior of Baden-Württemberg, Germany, on 13 July, 1960, preceded by explanatory comments. It is stated in an editorial footnote that these provisions are also applicable to some extent in Schleswig-Holstein.

SUKHORUKOV (K. T.) & TALIEVA (Mme M. N.). Действие антибиотиков из высших растений на фитопатогенные грибы и рост растений. [Effect of the antibiotics of higher plants on pathogenic fungi and the growth of plants.]—Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1960*, 39, pp. 33–42, 1960.

Ethereal oil from mandarin orange, gum of *Ferula kokanica* and *F. gummosa* roots, and wax from apple fruit surface [cf. **37**, 73] stimulated the germination of spores of fungi isolated from the plant parts from which the substances were obtained. Substances from different plants were inhibitory to *Penicillium expansum* and *Rhizopus nigricans* [*R. stolonifer*: **38**, 308] from apple and *P. italicum* from mandarin, but mostly stimulated *R. stolonifer*f rom *Solanum melongena* and *Botrytis allii* [cf. **39**, 278] and *Trichothecium roseum* [loc. cit.] from onion. Mycelial growth was generally inhibited and respiration stimulated. This is supposed to exhaust spore resources. The greatest chemotropism was observed in *R. stolonifer* from apple and *B. cinerea* from mandarin. Seed germination and growth of higher plants were not affected by the substances tested.

TAKAHASHI (N.) & CURTIS (R. W.). **Isolation and characterization of malformin.**

CURTIS (R. W.). **Studies on response of Bean seedlings and Corn roots to malformin.** —*Plant Physiol.*, **36**, 1, pp. 30–36, 5 graphs; pp. 37–43, 2 fig., 4 graphs, 1961.

The 1st paper, from Purdue Univ., Lafayette, Ind., describes the isolation of mal-

formin, a neutral peptide from the culture filtrate of *Aspergillus niger* [**38**, 129], and gives some characteristics of its molecule; the 2nd notes quantitative experiments on its activity.

PARRIS (G. K.). **Index of photographs in Phytopathology.**—*Misc. Publ. Bot. Dept Univ. Miss.* 2, a–j+233 pp., 1959. [Looseleaf. Cyclostyled. Received May 1961.]

The contents of this useful index to photographs in vols. 1–41 of *Phytopathology* are listed under subjects (pp. a–h), with subheadings such as causal agent and pathogens. Latin names of bacteria, fungi, and viruses, and the common names of viruses in alphabetical order with synonyms are given in the pathogen index.

DE TEMPE (J.). **Seed weakness.**

DE TEMPE (J.) & CROSIER (W. F.). **Pesticide treatment.**

DE TEMPE (J.). **Routine methods for determining the health condition of seeds in the seed testing station.**—*Proc. int. Seed Test. Ass.*, **26**, pp. 3–11; 12–26; 27–60, 1961. [19, 90, & 87 ref.]

Reprints of these papers are reissued by the I.S.T. Association [cf. **39**, 650], Wageningen, Netherlands, as 'Handbooks on Seed Health Testing', Ser. 1, Nos. 2, 3, and 4. In the 1st are discussed methods of evaluating seed weakness, a very variable characteristic affected by heredity and by environment both before and after sowing. Various methods of testing germination energy are reviewed.

The 2nd paper reviews physical and chemical methods of seed treatment and also methods of studying the properties of pesticides, including adsorption, transformation, and toxicity, for demonstrating that seed treatment has been carried out, and other allied problems that arise, such as the flow of treated seed through machinery.

The 3rd paper reviews methods for the pathological investigation of seeds under the general headings: (i) examination of the seed without germination or incubation, (ii) examination in a germination test, (iii) after incubation on agar media, (iv) examination of plants in greenhouse or field, (v) serological or other biochemical reactions, and (vi) evaluation of performance and weakness, each section being subdivided as to features to be observed or methods to be employed which are discussed in the light of specific examples.

HELLMERS (E.). **Fremavl af sygdomsfrie Stiklinger.** [Production of disease-free cuttings.]—*Nord. Jordbr Forskn., 1960, Suppl.* 1, pp. 174–177, 1960.

The theoretical principles underlying the development of resistant mother-plants are expounded and illustrated by concrete examples of their application to various ornamentals [cf. **34**, 525].

ZHUKOVSKIĬ (P. M.). Селекция на устойчивость сортов культурных растений к болезням. [Selection of cultivated plant varieties for disease resistance.]—*J. agric. Sci., Moscow*, **5**, 12, pp. 23–35, 1960. [Engl., Germ., Fr. summ.]

A further contribution from the Inst. Plant Industry, Moscow [**39**, 85], on genetic immunity, with the development of a hypothesis of the conjugate evolution of spermatophyte and parasitic spp. A brief account is given of the present position in the problem of physiological races and biotypes of rusts [*Puccinia* spp.], *Phytophthora infestans*, etc., and the appearance of new aggressive races of fungi through heterokaryosis. The application of the most modern breeding methods to field resistance and disease tolerance is discussed.

MISHUSTIN (E. N.) & TRISVYATSKIĬ (L. A.). Микробиология зерна и муки. [The microbiology of grain and flour.]—407 pp., illus., Moscow, Khleboizdat, 1960. Roubles 14.75.

A sect. of this monograph is devoted to 'Phytopathogenic micro-organisms'

(pp. 162–198), including fungi and viruses on cereals and grasses. 'Mycotoxicoses of animals and man' are discussed (pp. 199–214), as well as the 'Origin of the microflora of grain' (pp. 227–254) and 'The protection of grain and cereal products in store from the action of micro-organisms' (pp. 348–354).

Al'bitskaya (Mme O. N.) & Shaposhnikova (Mme N. A.). Влияние плесневых грибов на коррозию металлов. [The effect of mould fungi on metal corrosion.] —*Microbiology, Moscow*, **29**, 5, pp. 725–730, 1960. [Engl. summ.]

At the V.I. Lenin All-Union electrotechnical Inst., Moscow, samples of various organic electrical insulating materials were inoculated with spore suspensions of moulds to determine whether free acids collected on the surface during decomposition. *Aspergillus niger*, *A. amstelodami*, *Penicillium cyclopium*, *P. brevicompactum*, *Paecilomyces variotii*, *Stachybotrys atra*, and *Chaetomium globosum* were used and the samples incubated at 30±2° C. and 95–100% R.H.

In the breakdown of insulating varnishes and varnish cloth by fungi free acids collected on the surfaces, the quantity depending on the growth of the fungus on the particular substratum and the extent of decomposition. *A. niger*, *A. amstelodami*, *Penicillium cyclopium*, *P. brevicompactum*, and *Paecilomyces variotii* produced acid on Czapek medium with a glucose content of 3–10%.

Samples of Cu, oxidized Al, and steel wire (8 cm. long) were placed in flasks of agar (+16% glucose) inoculated with a water suspension of spores 2–4 days previously. After 28 days at 30±2° the wires showed a drastic decrease in rupture strength under the influence of the acids secreted by the fungi.

Belyakova (Mme L. A.). Гамма-излучение как средство дезинфекции книг от спор плесневых грибов. [Gamma-irradiation as a means of disinfecting books against spores of mould fungi.]—*Microbiology, Moscow*, **29**, 5, pp. 762–765, 1960. [Engl. summ.]

Tests by the V.I. Lenin State Library of the U.S.S.R. with radioactive Co^{60} confirmed previous findings [**40**, 401] that fungi vary in their resistance to γ-radiation. Most resistant of the moulds [cf. **35**, 534] were *Stemphylium* spp. and *Stachybotrys atra*, while *Aspergillus ruber*, *Oospora crustacea* [*Sporendonema casei*], *Penicillium herquei*, *P. simplicissimum*, and *Rhinotrichum parietinum* were most susceptible. Complete disinfection of books was achieved starting with a dose of 650,000 fer.

Plant quarantine announcements.—*F.A.O. Plant Prot. Bull.*, **9**, 2, pp. 30–31, 1960.

Canada. Order in Council P.C. 1960–148 of 11 Feb. 1960 (*Canad. Gaz.*, Part II, **94**, 4, 24 Feb., 1960) amends the Destructive Insect and Pest Regulations of 22 Dec. 1954. The major changes concern the importation of nursery stock and of soil with respect to (*inter alia*) potato wart disease (*Synchytrium endobioticum*).

Federal Republic of Germany. Ordinance of 28 July 1960 amends the Plant Protection [? Inspection] Ordinance of 23 Aug. 1957 [**37**, 264]. *Prunus* spp. are added to the list of plants prohibited from Bulgaria and Yugoslavia to prevent introduction of plum pox [virus].

United Arab Republic (Syrian Region). Decree-Act No. 237 of 17 July 1960 (*J. off.* 160, 18 July, 1960) regulates the imports and exports of plants and plant products, establishes powers of the Minister of Agric. in this connexion, and repeals Decree No. 132 of 7 Oct. 1953 and all other dispositions that may be contrary to the present decree.

Kryuger (L. V.). Динамика микоризообразования у некоторых луговых злаков. [Dynamics of mycorrhiza formation in some meadow grasses.]—*Agrobiology, Moscow*, *1961*, 2 (128), pp. 226–230, 5 fig., 1961. [21 ref.]

Observations in Krasnokamsk district, Perm area, U.S.S.R., revealed that the

endophytic mycorrhiza [cf. **40**, 52] of bromegrass [*Bromus inermis*], timothy grass [*Phleum pratense*], cocksfoot [*Dactylis glomerata*], and fescue [*Festuca pratensis*] develop only in the feeder roots arising from the basal nodes and not in the seed roots. They appeared first at tillering and increased considerably during flowering and seed formation. The development of the mycorrhiza depended on the season (most abundant in summer) and on various ecological factors; in sandy soils of pine forests mycorrhiza in the perennial grasses developed only in the 2nd year.

NAEF-ROTH (ST[EPHI]), GÄUMANN (E.), & ALBERSHEIM (P.). **Zur Bildung eines mazerierenden Fermentes durch Dothidea ribesia Fr.** [On the formation of a macerating enzyme by *D. ribesia*.]—*Phytopath. Z.*, **40**, 3, pp. 283–302, 1 fig., 1 graph, 1961. [Engl. summ. 28 ref.]

At the Eidg. technische Hochschule, Zürich, and the Biol. Lab., Harvard Univ., Cambridge, Mass., an isolate of *D.* [*Plowrightia*] *ribesia* from black currant [**37**, 215] was cultured on various nutrient solutions and the filtrates were tested for toxicity to plants and micro-organisms. A typical macerating effect on plant tissues was due to a high molecular, water soluble, antibiotically inactive enzyme, phytolysine, partially purified by fractional precipitation with acetone and easily distinguished from pectic enzymes. An antibiotic, plowrightin, extracted with ethyl acetate, was active against several bacteria and *Ustilago sphaerogena*; though not phytotoxic itself it enhanced the destruction of tomato shoots by phytolysine.

HUSAIN (M.) & AHMED (Q. A.). **Studies on the sporulation of Phytophthora parasitica Dastur var. piperina Dast., responsible for leaf and foot-rot of Pan, Piper betle L.**—*Mycopathologia*, **14**, 1, pp. 24–30, 1 graph, 1961.

At the Jute Res. Inst., Dacca, E. Pakistan, sporangia of *P. parasitica* var. *piperina* [cf. **39**, 183] formed only at 20–31° C.; 100% R.H. did not greatly favour their formation, for which free water appeared to be required. Zoospore liberation occurred only at 19–25° (max. at 21–23°) and was little affected by R.H. 100% in the absence of condensation. In free water the liberated zoospores germinated only at 20–24° (opt. 22°).

SPRECHER (E.). **Über die Stoffausscheidung bei Pilzen. I.** [On the secretion of substances by fungi. I.]—*Arch. Mikrobiol.*, **38**, 2, pp. 114–155, 4 graphs, 1960. [72 ref.]

Studies at the Botanisches Inst. der Technischen Hochschule, Karlsruhe, Germany, on the secretion of primary metabolic products by *Ceratocystis virescens*, *C. coerulescens*, and *Lentinus lepideus*.

MILLER (J. J.) & REID (J.). **Stimulation by light of sporulation in Trichoderma lignorum (Tode) Harz.**—*Canad. J. Bot.*, **39**, 2, pp. 259–262, 1 pl., 1961.

At the Dept Biol., Hamilton Coll., McMaster Univ., Ont., the exposure of cultures of *T. lignorum* [*T. viride*: cf. **37**, 453] to white light from a 25 w. bulb caused the formation of a ring of sporulation on the mycelium which was peripheral at the time of illumination. This response was initiated by only 1 ft.-candle for 1 min.; the most effective lights were violet and blue, yellow and red being ineffective.

RÖSCH (R.). **Untersuchungen über den Ligninabbau und über die Oxydasen von Braun- und Weissfäulepilzen.** [Studies on the lignin decomposition and the oxidases of brown and white rot fungi.]—*Arch. Mikrobiol.*, **38**, 1, pp. 73–106, 2 fig., 3 graphs, 1961. [73 ref.]

These studies at the Botanisches Inst. der technischen Hochschule, Karlsruhe, Germany, were concerned with whether brown rot fungi are really able to utilize isolated lignin as a C source [**30**, 296] and whether all deviating phenolase reactions of typical brown rot fungi can be attributed only to liberated tyrosinase.

Merulius lacrymans, contrary to the indications of Fischer [**33**, 191], was not able to utilize phenol lignin (from *Picea excelsa*) as sole C source. Brauns's lignin (from *P. mariana*) and phenol lignin are not attacked by brown rot fungi (*M. lacrymans*, *M. silvester*, *Coniophora cerebella* [*C. puteana*], *Poria vaporaria*), and only to a limited extent by white rot fungi (*Polystictus versicolor*, *Pholiota destruens*, *Ganoderma lucidum*, *Pleurotus ostreatus*).

The mycelial extract of all tested brown rot fungi oxidized guaiacol [**38**, 108], with opt. reaction at pH 3. With *p*-cresol the mycelial extract of *C. puteana* gave a precipitation reaction, with opt. at pH 3–4. The reactions of mycelial extracts of all the brown rot fungi with hydroquinone also indicate enzyme activity with an opt. at pH 3–4. These results suggest a laccase type of endofermentation in the mycelium of brown rot fungi which can occur with tyrosinase.

Weigl (J.) & Ziegler (H.). **Wasserhaushalt und Stoffleitung bei Merulius lacrymans (Wulf.) Fr.** [Water economy and nutrient translocation in *M. lacrymans*.] —*Arch. Mikrobiol.*, **37**, 2, pp. 124–133, 4 fig., 1 graph, 1960.

At the Bot. Inst. der technischen Hochschule, Darmstadt, Germany, *M. lacrymans* [cf. above] was found not to differ fundamentally from other wood-destroying fungi (*M. silvester*, *Coniophora cerebella* [*C. puteana*], *Polyporus vaporarius* [*Poria vaporaria*]) in its 'synthesis quotient' (g. dry wt. increase/g. respired glucose). Its respiration was reduced by 2,4-dinitrophenol [cf. **38**, 572] to about the same extent as that of *C. puteana* and even more so than that of *M. silvester*. It is concluded therefore that *M. lacrymans* does not acquire any specific capacity for water production with the decomposition of the substratum. Its mycelial strands are the route taken by marked phosphate and C^{14} glucose. The rate of progress is a min. of 2 cm./hr., which is much faster than normal diffusion. These tests provide support for, if not actual proof of, the assumption that *M. lacrymans* has a specific water conducting capacity.

Taylor (D. P.). **Biology and host-parasite relationships of the spiral nematode, Helicotylenchus microlobus.**—*Diss. Abstr.*, **21**, 4, pp. 721–722, 1960.

At the Univ. Minn. the addition of 5,000 specimens of this nematode to soil infested with *Aphanomyces euteiches* or *Rhizoctonia* [*Corticium*] *solani* did not affect the severity of *A.* root rot of peas [cf. **38**, 722] or *C.* root rot of soybeans [**36**, 272].

Corden (M. E.) & Young (R. A.). **Changes in soil mycoflora following treatment with fungicides.**—Abs. in *Phytopathology*, **51**, 1, p. 64, 1961.

Samples of freshly collected field soil treated with methylmercury oxinate (MO), mylone, vapam, nabam, and 2-chloro-3-(tolyl-sulphonyl)-propionitrile (CP 30249) at the ED_{95} for *Fusarium oxysporum* f. *cubense* [**40**, 318] were re-infested at intervals with spores or untreated soil or both. In MO-treated soils the fungus was re-established after 1 month, but only 1 week was required after the other treatments. Fungi initially decreased after all treatments; eventually *Penicillium* spp. increased slightly after vapam, and $\times 3$ after MO; *Trichoderma* spp. increased after nabam and CP 30249. Infestation by *F.o.* f. *cubense* was always greater in treated than in untreated soil.

Parmeter (J. R.) & Hood (J. R.). **The use of Fusarium culture filtrate media in the isolation of Fusaria from soil.**—*Phytopathology*, **51**, 3, pp. 164–168, 3 fig., 1 graph, 1961.

At Dept Plant Path., Univ. Calif., Berkeley, the isolation of *F. solani* f. *phaseoli* from soil [**38**, 641] on dilution plates was facilitated by the use of media prepared from filtrates of 2–3 week old potato dextrose broth cultures of the fungus, autoclaved with 2% agar. Isolates developed characteristic pigmentation and sporu-

lated well, and competing fungi were restricted. Filtrates from older cultures were inhibitory. *F. oxysporum* f. *conglutinans* [*F. conglutinans*] grew poorly on the *F.s.* f. *phaseoli* medium but well on its own filtrate. Mycelium of *Phytophthora* and *Pythium* did not grow on the filtrates, nor when returned to potato dextrose agar; growth was reduced but not prevented in filtrates diluted 50% and 75% with potato dextrose broth. The inhibitory properties were not affected by autoclaving.

KASK (K.). **Uusi tungaltera (Claviceps purpurea (Fr.) Tul.) peremeestaimi Eestis.** [On the occurrence of *C. purpurea* in Estonia.]—*Eesti NSV teadus Akad. Toimet.*, Ser. biol., **9**, 4, p. 343, 1960.

A list of 17 cereals and grasses is added to the known hosts of ergot in the country [**15**, 11].

TURNER (P. D.). **Complementary isolates of Phytophthora palmivora from Cacao and Rubber, and their taxonomy.**—*Phytopathology*, **51**, 3, pp. 161–164, 6 fig., 1961.

Examination at the W. Afr. Cocoa Res. Inst., Ghana [cf. **39**, 685], of over 200 isolates of *P. palmivora* from 22 countries showed that both the 'cacao' and 'rubber' strs. were present on each host. There is therefore no justification for the suggestion [**38**, 467] that isolates from cacao and rubber should be given varietal rank.

FISHER (E[ILEEN] E.) & FREEMAN (H.). **Plant diseases recorded in Victoria. Sections 2, 3, 4.**—*J. Agric. Vict.*, **58**, 6, pp. 404–406, 1960; **59**, 1, pp. 61–64; 2, pp. 114–117, 1961.

Sect. 2 [cf. **39**, 308] covers quince, *Diospyros australis*, persimmon, loquat, fig, strawberry, walnut, mulberry, *Passiflora edulis*, and *P. manicata*; sect. 3 covers stone fruits; and sect. 4 apple, pear, berry and other soft fruits, and vine. Diseases of economic importance are marked.

PARRIS (G. K.). **A revised host index of Mississippi plant diseases.**—*Misc. Publ. Bot. Dept Univ. Miss.* 1, 146 pp., 1959. [Received May 1961.]

This list follows in form its predecessor [**26**, 554], with subsequent records added.

KRAMER (C. L.), PADY (S. M.), & ROGERSON (C. T.). **Kansas aeromycology IV. Alternaria. VIII. Phycomycetes.**

KRAMER (C. L.) & PADY (S. M.). **IX. Ascomycetes. X. Basidiomycetes. XI. Fungi imperfecti.**—*Trans. Kans. Acad. Sci.*, **62**, 4, pp. 252–256, 2 graphs, 1959; **63**, 1, pp. 19–23; 2, pp. 53–60, 3 graphs; 3, pp. 125–134, 2 graphs; 4, pp. 228–238, 2 graphs, 1960. [19, 20, 22, 30, and 25 ref.]

Alternaria spores comprised 3·4% of the total air spora [cf. **40**, 34] collected and 12·6% of the total colonies obtained. During the growing season spores averaged 20–30/cu. ft. air, dropping to < 1 in the winter. *A. tenuis* was the sp. most commonly isolated.

Of the 8 Phycomycete genera (all Mucorales) represented as 1% of the total colonies, *Rhizopus* (chiefly *R. oryzae*) was the most common.

Of the 15 genera and 26 spp. of Ascomycetes, yeasts formed by far the largest part (8·4% of the total colonies), < 321·7/cu. ft. being recorded. Among the other genera were *Chaetomium*, *Thielavia*, *Cochliobolus*, *Gibberella*, *Leptosphaeria*, and *Pleospora*. The commonest ascospore obtained was unidentified.

The highest numbers of basidiospores, up to 675/cu. ft., were obtained after rain in June. *Polyporus* [*Polystictus*] *versicolor*, *Polyporus hirsutus*, *Trametes suaveolens*, *Collybia velutipes*, and *Coprinus* sp. were identified. Among the rusts, *Puccinia*

recondita appeared on 1 May, and *P. graminis* on 1 June, with maxima (a total of 16/cu. ft.) in June and July.

The majority of the spores obtained were of fungi imperfecti. Here [cf. **39**, 382] 59 additional genera are listed. The more common ones included *Fusarium* (720 colonies from a total of 113,667), *Helminthosporium* (214), *Pullularia pullulans* (531), and *Geotrichum* (403). [Parts V–VII in this series are to appear in *Mycologia*.]

Bukhalo (A. S.). Нові та рідкісні для флори УРСР види грибів з лівобережного лісостепу. [New and rare fungus species in the flora of the Ukrainian S.S.R. from the left-bank forest-steppe.] —*J. Bot. Acad. Sci. Ukr.*, **17**, 6, pp. 94–99, 1960. [Russ., Engl. summ.]

A list of 18 ascomycetes and 35 fungi imperfecti from the area of the river Vorskla middle course.

Chadefaud (M.) & Emberger (L.). **Traité de botanique systematique. Tome I.** Chadefaud (M.). **Les végétaux non vasculaires (Cryptogamie).** [A treatise on systematic botany. Vol. I. Non-vascular plants (Cryptogams).] —xv+1,018 pp., 713 fig., Paris, Masson et Cie, Éditeurs, 1960. Paper covers, 185 N.F.; cloth, 200 N.F.

Part II (pp. 17–77) of this generously planned review of descriptive and systematic botany covers the Schizomycetes (blue-green algae and bacteria), Part III (pp. 421–902) all fungal groups (including lichens and myxomycetes).

Israfilbekov (L. E.). Азәрбајчанда мушаһидә олунан **Septoria Fries.** көбәләкләри. [Fungi of the genus *Septoria* in Azerbaijan S.S.R.]—Учен. Зап. азерб. Унив. [*Uchen. Zap. azerb. Univ.*], biol. Ser., *1959*, 5, pp. 17–25, 1959. [Azeri with Russ. summ. Abs. in *Referat. Zh. Biol.*, *1961*, 7, Sect. v, p. 11, 1961.]

This list of 21 spp. includes *S. piricola* [*Mycosphaerella sentina*: **39**, 284], widespread on pear.

Kern (H.). **Physiologische und systematische Untersuchungen in der Gattung Leucostoma.** [Physiological and systematic studies on the genus *Leucostoma*.] —*Phytopath. Z.*, **40**, 3, pp. 303–314, 1 graph, 1961. [Engl. summ.]

In further studies [cf. **37**, 215] at the Inst. für spezielle Botanik der Eidg. technischen Hochschule, Zürich, the growth of numerous *Leucostoma* and *Valsa* [cf. **40**, 252] isolates on certain bark extracts (e.g. those of *Populus alba* or *Prunus avium*) was used as a taxonomic character. With the aid of poplar bark extracts the difference between *L.* [*V.*] *massariana* (growth inhibited) and *L.* [*V.*] *persoonii* (not inhibited) was corroborated. The spp. within the sections of the genus are often difficult to separate on a morphological and physiological basis, but in some cases specific host-parasite relations exist.

Solheim (W. G.) & Cummins (G. B.). **Mycoflora saximontanensis exsiccata. Centum XI.**

Solheim (W. G.). **Mycoflora saximontanensis exsiccata. Centum XII.**—*Univ. Wyo. Publ.*, **24**, 3, pp. 22–33, 34–55, 1960.

The 1st list (Nos. 1001–1100) is entirely of Uredinales, the 2nd (Nos. 1101–1200) of other microfungi, including some new spp. [**37**, 457].

Hiratsuka (N.). **A provisional list of Uredinales of Japan proper and the Ryukyu Islands. Contributions to the rust flora of Eastern Asia : IX.**—*Sci. Bull. Div. Agric. Univ. Ryukyus* 7, pp. 189–314, 1960.

This further contribution [cf. **35**, 125] concludes with indexes to fungi (784 spp.) and hosts.

GREENE (H. C.). **Notes on Wisconsin parasitic fungi. XXVI.**—*Trans. Wis. Acad. Sci. Arts Lett.*, **49**, pp. 85–111, 1960.

This further list [cf. **38**, 580] includes 4 fungi new to the State and 9 new spp.

CARLISLE (M. J.), LEWIS (B. G.), MORDUE (ELIZABETH M.), & NORTHOVER (J.). **The development of coremia. 1. Penicillium claviforme.**—*Trans. Brit. mycol. Soc.*, **44**, 1, pp. 129–133, 1 pl. (6 fig.), 3 fig., 1961.

On 3% malt agar in a thermo-regulated dark room at the Dept Bot., Univ. Bristol, coremial formation was strongly influenced by light and nutrition. Positive phototropism occurred only during the first 2 mm. of growth. The stalks grew by uniform elongation at the apex: when growth ceased the head differentiated and sporulation took place. If the growing tips were removed, there was a brief return to photosensitivity and the coremia were able to regenerate. Excised coremia were grown fixed vertically to the edge of a slide with lanolin so that the cut end dipped in a dish of distilled water or malt extract (1 or 3%). Head differentiation took place normally and regeneration occurred after the tips were cut off.

SMITH (K. M.). **Plant viruses. Third Edition.**—xii+209 pp., 8 pl. (18 fig.), 2 fig., London, Methuen & Co., Ltd.; New York, John Wiley & Sons, Inc., 1960. 16*s*. 6*d*.

The contents have been increased [cf. **27**, 461; **36**, 303] to 13 chapt. (each with a bibliography) in 2 parts, the 1st dealing with basic principles and the 2nd with practical methods of study. Additional chapt. cover historical aspects; dissemination: physiology of plant virus diseases; latent infections; electron microscopy; mechanical methods of inoculation; testing for viruses; local lesions and virus complexes: and purification. Indicator plants of some common viruses are listed in an appendix.

SMITH (K. M.) & LAUFFER (M. A.) (Editors). **Advances in virus research. Volume VII.**—ix+397 pp., 37 fig., 6 diag., 5 graphs, New York and London, Academic Press Inc., 1960. $10.00.

The reviews by D. B. HARRISON, 'The biology of soil-borne plant viruses' (pp. 131–161) and J. H. HITCHBORN & A. D. THOMSON, 'Variation in plant viruses' (pp. 163–191) will interest plant pathologists. Those by M. K. BRAKKE, 'Density gradient centrifugation and its application to plant viruses' (pp. 193–224), and A. KLUG & D. L. D. CASPAR, 'The structure of small viruses' (pp. 225–325), are more academic. All have long bibliographies.

WETTER (C.). **Partielle Reinigung einiger gestreckter Pflanzenviren und ihre Verwendung als Antigen bei der Immunisierung mittels Freundschem Adjuvans.** [Partial purification of some elongated plant viruses and their use as antigens in immunization by means of Freund's adjuvant.]—*Arch. Mikrobiol.*, **37**, 3, pp. 278–292, 1 fig., 8 graphs, 1960. [Engl. summ.]

Partially purified preparations, obtained more easily by using ether or CCl_4 for preliminary sap clarification, were serologically active and as far as tested infectious. They were used as antigens in immunological studies at Inst. für Virusserologie der biologischen Bundesanstalt für Land- und Forstwirtschaft, Brunswick, Germany, with the viruses of bean common mosaic, bean yellow mosaic, pea streak, white clover mosaic [pea mottle], carnation latent [str. potato paracrinkle] virus, and potato viruses M, S, X, and Y. Rabbits were injected intravenously with saline suspensions of antigen and intramuscularly with an emulsion of antigen in Freund's adjuvant, which gave higher titres.

RAPPAPORT (I.). **Analysis of the cross-reaction between two strains of Tobacco mosaic virus.**—*Nature, Lond.*, **189**, 4769, pp. 986–990, 7 fig., 1960.

A theoretical consideration, from Dept Bot., Univ. Calif., Los Angeles, of possible relationships between serological findings and antigenic structure.

VAN VELSEN (R. J.) & CROWLEY (N. C.). **Centrosema mosaic : a plant virus disease transmitted by both aphids and plant bugs.**—*Nature, Lond.*, **189**, 4767, p. 858, 1961.

In studies at the Lowlands agric. Exp. Sta., Keravat, New Britain, Territory of Papua and New Guinea, this previously undescribed virus disease was transmitted mechanically, by *Cuscuta campestris*, by the aphids *Aphis gossypii* (only under laboratory conditions) and *Brachycaudus helichrysi* ? var. *warei*, and by 2 spp. of *Nysius* (plant bugs). The plant bugs were able to transmit the virus to *Crotalaria anagyroides* after an access feeding period of 2 hr. and within a test feeding period of 24 hr., while *B. helichrysi* var. *warei* transmitted after acquisition for 12 min. and remained infectious for 48 (but not 72) hr.

Centrosema mosaic virus occurs naturally in *C. pubescens*, *Calopogonium mucunoides*, *Crotalaria anagyroides*, *C. goreenis*, *C. retusa*, *C. mucronata*, and *Desmodium distortum*. The virus was transmitted mechanically to *C. juncea*, *C. spectabilis*, *C. incana*, *C. intermedia*, *C. lanceolata*, *C. usaramoensis*, and *Stizolobium deeringianum*.

Inactivation of virus preparations occurred after 10 min. at 58° C., 6 hr. at 28°, and at a dilution of 1:2,000.

CADMAN (C. H.) & LISTER (R. M.). **Relationship between Tomato ringspot and Peach yellow bud mosaic viruses.**—*Phytopathology*, **51**, 1, pp. 29–31, 1961. [21 ref.]

Details are given of plant-protection and serological tests at the Scottish hort. Res. Inst., Invergowrie, from which it was concluded that peach yellow bud mosaic virus should be regarded as synonymous with tomato ringspot virus [**40**, 143].

OERTEL (C.). **Die Verwendung eines Serums gegen normale Pflanzeneiweisse für die Gewinnung eines hochwertigen Antigens.** [The use of a serum against normal plant proteins for the production of a high quality antigen.]—*Phytopath. Z.*, **40**, 3, pp. 272–276, 1 graph, 1961.

The production of this antiserum is described from the Phytopathologisches Inst., Martin Luther Univ., Halle-Wittenberg, Germany. It was used for following the relationship of normal plant protein to virus protein during the course of a year in tobacco infected by tomato aspermy virus; testing partially purified virus for its plant protein content; and saturation of antigens which still contained plant protein. Such saturated antigens give antisera with a high titre against the virus, but no reaction to normal plant protein.

VÖLK (J.). **Beobachtungen zur Ausbreitung des Tabakrippenbräunestammes des Y-Virus im Freiland.** [Observations on the spread of the Tobacco vein-necrosis str. of virus Y in the field.]—*Zbl. Bakt.*, Abt. 2, **113**, pp. 687–699, 10 graphs, 1960.

Further observations [cf. **39**, 244] by the Inst. für landwirtschaftliche Virusforschung, Brunswick, showed that the spread of the vein necrosis str. of potato virus Y on potato in 1954–59 and on resistant and susceptible Virginia type tobacco in 1958–9 [**40**, 63] was dependent on aphid activity (mostly *Myzus persicae*, *Aphis rhamni*, *A. frangulae*, and *Macrosiphon solanifolii* [*Macrosiphum euphorbiae*]) [**39**, 437] and especially intensive when flights started before June. There was early and high aphid activity in 1954, 1957, and 1959, with over 50% infection by 10–15 July (20 June in 1959), while in 1955, when aphids were few and late-appearing,

this figure was reached only on 8 Aug. In N. Germany, where tobacco is planted late, the early flying aphids alight in May on very young and susceptible plants. Early foci of infection are especially important, as infected plants may themselves become sources of infection after about a week. Except in 1956, *Myzus persicae* was found in the greatest numbers and was the main vector in the field.

Chambers (J.). **High health status nursery stock. Scotland as a potential producer.**—Reprinted from *Scot. Agric.* (*1960*), 4 pp., 1 pl., 1960.

Recent techniques developed at the hort. Res. Inst., Invergowrie, Dundee, indicate that virus-free raspberry and strawberry planting stocks comparable with potato seed stocks [cf. **38**, 761] could be produced on a large scale. The factors involved are reviewed.

Ikäheimo (Katri). **Two cereal virus diseases in Finland.**—*Maataloust. Aikakausk.*, **32**, pp. 62–70, 1960. [Finnish summ.]

A report from the Agric. Res. Centre, Tikkurila, of the detection in oats in W. and S. Finland of cereal [barley] yellow dwarf virus [cf. **37**, 363]. Transmission by *Rhopalosiphum padi* was demonstrated. Wheat striate mosaic virus from oats was transmitted by *Calligypona pellucida* to wheat and barley.

Ashworth (L. J.) & Futrell (M. C.). **Sources, transmission, symptomatology, and distribution of Wheat streak mosaic virus in Texas.**—*Plant Dis. Reptr*, **45**, 3, 1 fig., 1 map, 1961.

During 1959–60 wheat streak mosaic virus [**39**, 224] was found to be generally distributed throughout the High Plains region of Texas [**39**, 250], in native grasses, and later in wheat, being the 1st report from this State, though the virus is probably not new there.

Mazhdrakov (P.). Апарат за отделяне на спори. [Apparatus for separation of spores.]—Раст. Защ. [*Rast. Zasht.*], **9**, 1, pp. 46–48, 1 fig., 1961.

The apparatus used at Inst. Biol. M. Popov, Bulgarian Acad. Sci., to obtain spores of *Tilletia laevis* [*T. foetida*] from infected wheat leaves consists of an upper sieve with holes 1·5 mm. diam., a lower one with 0·15 mm. holes, and a spore reservoir beneath. The spores are separated by shaking 10 g. leaf matter on the upper sieve with finely grained quartz (2·5–4 mm.) or small glass balls (200 g.) and by sifting the resulting material on the lower sieve for 3–5 min. The same technique was used to obtain spores of other spp., e.g. of *Helminthosporium turcicum* on maize.

Hermansen (J. E.). **Heterokaryosis og parasexualisme som grundlag for fremkomsten af nye smitteracer hos rustsvampene.** [Heterokaryosis and parasexualism as a basis for the production of new infective races of rust fungi.]—*Ugeskr. Landm.*, **104**, pp. 703–704, 1959. [Received Mar. 1961.]

Summaries of 3 recent American contributions [**35**, 596; **38**, 737; **39**, 17] in relation to cereal rusts.

The cereal rusts. Proceedings, 7 October 1960.—Abs. in *Trans. Brit. mycol. Soc.*, **44**, 1, pp. 134–139, 1961.

D. J. Griffiths (Aberystwyth): **Breeding for resistance to crown rust in the Oat crop.** The reactions of the 13 races of *Puccinia coronata* [f.sp.] *avenae* [cf. **40**, 220] present in Britain and the hexaploid, tetraploid, and diploid genotypes of *Avena* resistant to them were described, also investigations with U.V.-irradiated uredospores of race 96.

D. A. Doling (Cambridge): **West European yellow rust investigations.** During 1957–60 the percentage infection by *P. glumarum* [*P. striiformis*: **39**, 98] in Europe

was low, though epidemics occurred in a few areas. Evidence indicates that the disease is endemic in most countries and that the pathogen overwinters as mycelium in symptomless leaves. Nine physiologic races have been identified, though some of the standard differentials are no longer of any value. Seedling reactions in the greenhouse do not always correspond to mature plant reactions in the field.

R. C. F. Macer (Cambridge): **Breeding for resistance to yellow rust in Wheat.** *P. striiformis* is the most serious wheat rust in Britain, but in recent years losses have been reduced by the use of resistant vars. In greenhouse resistance tests uredospores are blown from a 'Cyclone Duster' on to seedlings then kept under polythene humidity covers. Within 14–17 days symptoms appear and are grouped into 7 reaction types. Seedling resistance is governed by major genes and is race-specific, while mature plant resistance may be polygenically inherited. Susceptible lines are eliminated after field trials. In the F_2 populations and F_2 plant progenies from crosses between 7 wheat vars. inoculated with races 2B, 5, 8, and 8B of *P. striiformis* 7 alleles conferring resistance were identified at 4 loci: 5 were dominant, 1 recessive, and the other dominant or recessive according to the pathogenicity of the race.

R. S. Smith (Imperial College): **Uredospore dissemination and infection.** Using a Hirst spore trap in a field infested with *P. graminis* [**40**, 3] the author obtained max. uredospore collections when there was no surface wetness, when temp. and radiation were high, and R.H. was 30–39%.

L. Ogilvie (N.A.A.S. Bristol): **The West European and British black rust investigations.**

I. G. Thorpe (Bristol): **Recent work at Bristol on black rust epidemics.** These 2 papers gave a general review of information on *P. graminis* already noticed in part [**39**, 162].

W. H. Hogg (Bristol): **Meteorology in relation to recent black rust epidemics.** Details are given of the methods of plotting air trajectories, using pressure charts for appropriate levels, to determine the source of *P. graminis* uredospores in Britain, which suggest they come mainly from France and the Iberian Peninsula [loc. cit.].

H. A. Hyde & K. F. Adams (Nat. Mus. Wales, Cardiff): **Spore trapping in relation to recent black rust epidemics.** Each year a few *P. graminis* uredospores have been caught in Wales before the possibility of any outbreaks in the British Isles. It is concluded that these spores have been blown across from Europe [cf. below].

J. M. Hirst (Rothamsted): **The aerobiology of Puccinia graminis uredospores.** Wind tunnel experiments were described which led to the conclusion that uredospores of *P. graminis* are abscissed some time before dispersal, so that at the beginning of a shower of rain the freed spores are dispersed, possibly by mechanical shock. Other experiments with water drops falling on infected straws indicated that impaction caused release of uredospores. Uredospores were also caught in 1957, 1958, and 1959 at 2,000–5,000 ft. over the English Channel when ground traps suggested that they might be moving in.

Zadoks (J. C.). **Verslag van een reis naar Spanje en Portugal ter bestudering van de epidemiologie van de gele roest.** [Report on a trip to Spain and Portugal for the study of the epidemiology of yellow rust.]—*Tech. Ber. ned. Graan-centrum* 3, 22+36 (unnumbered) pp., 16 maps, 1 graph, 1960. [Engl. summ.]

A southern origin of yellow rust [*Puccinia striiformis*: cf. above] epidemics being suspected, in line with black rust [*P. graminis*], known to be carried by winds from Morocco to Portugal [cf. **38**, 196], the author visited 3 experimental stations in Spain and 4 in Portugal in 1958. The occurrence in the Peninsula of bunt [*Tilletia caries*], loose smut [*Ustilago nuda*], leaf spot [*Septoria tritici*], mildew [*Erysiphe graminis*,] and the 2 rusts [also *P. recondita*] is briefly discussed, and yellow rust more generally in W. Europe. Phenological and climatological observations are presented,

and the organization of agricultural research in the 2 countries is briefly described. The author concludes that there is no direct connexion between epidemics of *P. striiformis* in the Low Countries [**38**, 736] and in the Peninsula [**34**, 217], though incidental carriage of inoculum by wind is theoretically possible.

HERMANSEN (J. E.). **Om rustangreb på saeden i Danmark i 1958.** [On rust infection of cereal seed in Denmark in 1958.] —*Nord. JordbrForskn.*, *1960*, *Suppl.* 1, pp. 289–291, 1960.

During 1958 there were heavy attacks of *Puccinia glumarum* [*P. striiformis*] and *P. triticina* [*P. recondita*] on wheat and of *P. dispersa* on all the common rye vars. at 2 experimental farms of the State agric. Coll. *P. graminis* was also present on wheat and rye, *P. striiformis* and *P. hordei* on barley, and *P. coronata* on oats. Heine VII wheat was markedly susceptible to *P. striiformis* (all strs.) and the common vars. to *P. recondita*, while Capelle Desprez was relatively little attacked.

The distribution of physiologic races of all these rusts, except *P. dispersa*, in samples of uredospores from various localities in Zealand, determined by the use of 5 differential vars., was as follows: races 62, 11, 14, and 143 of *P. recondita* each isolated from 1 sample, 57 from 3, and 20 from 8 collections; of 7 samples of *P. striiformis*, 2 yielded race 8, while varietal reactions to the remainder corresponded to the descriptions of 7, except in Carsten V, which developed symptoms of the 2–3 or 3 type instead of 4; race 21 was isolated from 4 of 5 collections of *P. graminis* and 194 from the other; of 3 samples of *P. hordei*, 1 yielded race 19 UN (unified numeration) and the others race 8 UN; races 228 and 234 developed from 2 collections of *P. coronata*.

In the reaction tests performed during 1958–9 on 17 named wheat vars. all were susceptible to races 21 and 194 of *P. graminis*, and all except Capelle Desprez, Abed 51, and Weibulls 5323 to *P. recondita*. Capelle Desprez was susceptible to 11, 14, 57, and 62 of *P. recondita*, resistant to 20 and 143; Abed 51 (a mixture of susceptible and resistant lines) susceptible or resistant to 11, 14, 57, 62, and 143 and susceptible to 20; and Weibulls 5323 (also a mixture) susceptible or resistant to 11, 14, 57, and 62 and susceptible to 20 and 143.

ROHRINGER (R.) & HEITEFUSS (R.). **Incorporation of P^{32} into ribonucleic acid of rusted Wheat leaves.**—*Canad. J. Bot.*, **39**, 2, pp. 263–267, 1961.

Ribonucleic acid (RNA) was isolated from detached Little Club and Khapli wheat leaves, infected with *Puccinia graminis* [f.sp.] *tritici* race 21 or with *P. recondita* race 52a, and fed with P^{32}-labelled orthophosphate [cf. **35**, 915 *et passim*] at the Inst. Pflanzenpath., Univ. Göttingen, Germany. The specific activity of RNA from susceptible tissue had increased 60–208% $4\frac{1}{2}$ days after inoculation, but after $7\frac{1}{2}$ days was not markedly different from RNA from uninoculated leaves. In resistant tissue the incorporation of P^{32} into RNA was unaffected by infection. Possible explanations of these differing results are discussed.

SIEBERT (RENATE). **Biochemische Untersuchungen zum Wirt-Parasit-Verhältnis am Beispiel von Puccinia graminis tritici.** [Biochemical studies on the host-parasite relationship as exemplified by *P. g. tritici*.]—*Phytopath. Z.*, **40**, 3, pp. 221–244, 3 graphs, 1961. [Engl. summ. 51 ref.]

At the Inst. für Pflanzenpathologie und Pflanzenschutz, Georg-August Univ., Göttingen, Germany, increases in amino acid concs. in a susceptible (Marquis) and a resistant (Vernal) wheat var. occurred after inoculation with *P. graminis* [**37**, 348]. Disease development was inhibited completely by vacuum infiltration of thiosemicarbazide, semicarbazide, and fluoroacetic acid into the leaves immediately before inoculation, and to varying degrees by treatment 3 days afterwards. The treatment was followed by an accumulation of amino compounds and a reduction

in sugar conc. The O_2 uptake of infected leaves was altered to various degrees by the inhibitory substances; thiosemicarbazide caused an inhibition or an acceleration according to the time and duration of application. The effect of light on inhibition of O_2 uptake by fluoroacetic and malonic acid could be examined by varying the light intensity; during the course of disease development, phases of different sensitivity were distinguished.

KANTEMIR (I.), GENER (S.), KAYAALP (O.), & TIMLIOGLU (Ö.). **Experimental studies on hexachlorobenzene and organic mercurial compounds which are used to protect Wheat seed from fungal diseases.**

KANTEMIR (I.) & TIMLIOGLU (Ö.). **Experiments on acute toxicity of hexachlorobenzene preparations used to protect Wheat seed from fungal disease.**

KANTEMIR (I.), CAM (C.), & KAYAALP (O.). **Investigations and observations on two diseases: kara yara and pembe yara which are observed in the South-East part of Turkey.**—*Turk. Bull. Hyg. exp. Biol.*, **20**, 1, pp. 31–36, 2 fig.; pp. 45–49; pp. 79–83, 5 pl. (22 fig.), 1960. (Fuller versions in Turkish pp. 19–30, 37–44, 51–77.) [Abs. in *Trop. Dis. Bull.*, **58**, 1, pp. 130–131, 1961.]

Papers from the Institute of Pharmacology, Univ. Ankara, and from the Clinic of Dermat., Diyarbekir Nümune Hosp., on poisoning in Turkey caused by eating bread made from wheat grain treated with hexachlorobenzene against *Tilletia tritici* [*T. caries*].

GLAESER (GERTRUD). **Das Ausmass des Feldbefalles durch Weizensteinbrand (Tilletia tritici Bjerk/Winter) in Abhängigkeit von der Bebrandung des Saatgutes.** [The extent of field attack by Wheat bunt (*T. caries*) in relation to seed infestation.]—*PflSchBer.*, **26**, 3–4, pp. 33–55, 2 graphs, 1961. [Engl. summ. 34 ref.]

At the Bundesanstalt für Pflanzenschutz, Vienna, the incidence of *T. caries* in crops of both a less susceptible var., Austro Bankut, and the highly susceptible Stamm 101 was proportional to the spore load applied (3–3,500/seed) [**3**, 30]. Seed disinfection with ceresan UT 11·975 reduced the disease to a similar level regardless of spore load and var. [cf. **34**, 359]. As only 3 or 10 spores/seed, which is tolerated under Austrian regulations, will give, respectively, 12 and 42 smutted heads/120 sq. m., it is suggested that treatment should be prescribed for samples with even the lowest infestation.

DOLING (D. A.). **Glume blotch in Wheat varieties, 1958.**—*Plant Path.*, **10**, 1, pp. 24–27, 1 graph, 1961.

In 1958 at the National Inst. agric. Bot., Cambridge, 67 winter wheat vars., of which 19 were also sown in the spring, and 26 spring wheats were sampled at harvest for *Septoria nodorum* [**23**, 11; cf. **39**, 406 *et passim*] by eye, then examined in more detail, a disease index figure for each var. being calculated.

Spring vars. were not more severely attacked than winter, and within each group no correlation was found between severity of infection and date of earing. In vars. sown both in winter and spring infection was generally more severe in the 2nd sowing. The incidence of seed-borne infection was generally low and unrelated to the disease level on the ears.

HIRANE (S.). **Studies on Pythium snow blight of Wheat and Barley, with special reference to the taxonomy of the pathogens.**—*Trans. mycol. Soc. Japan*, **2**, 5, pp. 82–87, 5 fig., 1960. [Jap. Abs. from Engl. summ.]

Of 6 *P.* spp. associated with snow blight of cereals [cf. **32**, 370] in the snowy regions of Hokuriku, Honshu, *P. paddicum* and *P. horinouchiense* are described as new.

The former has spherical or ellipsoidal proliferating sporangia 25–34 × 21–27 μ and spiny oogonia 14–30 μ diam. with a single aplerotic oospore and 3–4 monoclinous or diclinous antheridia. It also attacks oats, rice, and other crops. The sporangia of the latter sp. were not found; the oogonia were spherical, 21–32 μ diam. with a single aplerotic oospore and 1–3 (4) monoclinous or diclinous antheridia. *P. paddicum* and *P. iwayamai* [**15**, 57] are the most serious pathogens.

Rochow (W. F.). **Specialization among greenbugs in the transmission of Barley yellow dwarf virus.**—*Phytopathology*, **50**, 12, pp. 881–884, 1 fig., 1960.

In further trials at Cornell Univ. agric. Exp. Sta. a field isolate of the virus [**39**, 301; **40**, 411] was transmitted by *Toxoptera graminum* [**40**, 356] from Fla to 1 of 92 oat plants, by those from Wis. to 49 of 90 plants, and by those from Ill. to 59 of 87. The Fla collection failed to transmit 3 other isolates, 2 of which were transmitted by the other collections. The beak tips of the aphids from Fla differed slightly from those of the others. These results are considered to indicate physiological specialization in *T. graminum* with respect to transmission of the virus.

Orlob (G. B.) & Arny (D. C.). **Influence on some environmental factors and growth substances on the development of Barley yellow dwarf.**—*Plant Dis. Reptr*, **45**, 3, pp. 192–195, 2 fig., 1961.

At Dept Plant Path., Univ. Wis., Madison, symptoms of barley yellow dwarf virus [cf. above] in oats and barley were more severe at low temps. and with long days and high light intensity, but resistant vars. were less affected by environment than susceptible. When the susceptible were sprayed with gibberellic acid the stunting effect of the virus was partially overcome. When infected plants were sprayed with 10 p.p.m. 3-indoleacetic acid they were more tolerant of the virus than untreated plants.

Kavanagh (T.). **Inoculating Barley seedlings with Ustilago nuda and Wheat seedlings with U. tritici. Temperature in relation to loose smut in Barley and Wheat.**—*Phytopathology*, **51**, 3, pp. 175–177; pp. 189–193, 6 fig., 1961.

Expanded accounts of information on *U. nuda* already noticed [**39**, 164].

Zhukova (Mme V. I.). Термическая обработка семян Ячменя с применением электродной установки. [Thermal treatment of Barley seed with application of an electrode contrivance.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 3, pp. 26–27, 1961.

A description is given of an apparatus used at the Belgorod regional agric. exp. Sta. consisting of a 2000–2500 l. water container with the electrodes in its walls and base for 380 v. alternating current, thermostatically controlled at 47° [C.]. A 2-hr. immersion of boxes (8) with wire net bottoms, holding 500 kg. barley seed between them, resulted in total destruction of loose smut [*Ustilago nuda*].

Morton (D. J.). **Trypan blue and boiling lactophenol for staining and clearing Barley tissues infected with Ustilago nuda.**—*Phytopathology*, **51**, 1, pp. 27–29, 7 fig., 1961.

A more detailed description of a modification of the method [cf. **40**, 355] for staining mycelium of *U. nuda* in barley embryos with trypan blue [**40**, 164], either at 0·05–0·1% in the 5% NaOH used in extracting the embryos or at 0·01–0·05% in the lactophenol used for clearing. Seedlings may be boiled in 0·001–0·005% trypan blue in lactophenol.

Lutey (R. W.) & Fezer (K. D.). **The role of infested straw in the epiphytology of Septoria leaf blotch of Barley.**—*Phytopathology*, **50**, 12, pp. 910–913, 3 fig., 1960.

Since 1955 *S. passerinii* [**38**, 592] has been prevalent in the Red River Valley,

Minn., possibly owing to overwintering of the pathogen on barley straw residues which are blown about by the high winds prevailing in the area. In experiments the fungus survived as pycnidia on straw, either in or on soil, for at least 2 winters. Conidia, abundant on infested material after rain, were spread by insects or splashing raindrops. Pathogenic differences among isolates of *S. passerinii* were demonstrated.

SCHIEBER (E.) & FUMAGALLI (A.). **Rhynchosporium scald, severe disease of Barley in Guatemala.**—*Plant Dis. Reptr*, **45**, 3, p. 227, 2 fig., 1961.

Barley in the highlands of Guatemala is severely affected by *R. secalis* [map 383]. A hull-less selection from Utah, U.S.A., showed promising resistance and Forrest remained disease-free when sown late in the season.

ROTHMAN (P. G.). **Host-parasite interactions of eight varieties of Oats infected with race 202 of Puccinia coronata var. avenae.**—*Phytopathology*, **50**, 12, pp. 914–918, 2 fig., 1960.

At the Agron. Dept, Ill. agric. Exp. Sta., Urbana, 4 groups of oat vars. were distinguished by their reactions to inoculation with race 202. In the 1st group (Columbia, Clinton 25, Marion) infection followed the course typical of a susceptible host. In the 2nd (Tama) some of the substomatal vesicles failed to produce infection hyphae and the growth rate of the rust lagged 24 hr. behind that of group 1; uredia were surrounded by a definite chlorotic area. Substomatal vesicles appeared granular in the 3rd (Clintafe, Clintland) and 4th (Santa Fe. Landhafer) groups. In group 3 antagonistic reactions between host and rust occurred 72 hr. after inoculation, with rapid necrosis of the entire inoculated leaf. In 4, cellular disorganization of the invaded host tissue after 18 hr. prevented further spread of the mycelium.

BERRY (R. W.) & FUTRELL (M. C.). **Toxin production by Helminthosporium victoriae on synthetic media containing different nitrogen sources.**—*Phytopathology*, **51**, 3, pp. 177–179, 1961.

A more detailed account of studies on *H.* [*Cochliobolus*] *victoriae* from oats [**40**. 165].

VELIKOVSKÝ (V.) & KRHOUNEK (S.). **Výsledky měření v porostech ozimého Žita při zjišťování vztahů mezi některými mikroklimatickými faktory a rozvojem plísně sněžné.** [Results of measurements in winter Rye stands for the determination of relations between some micro-climatic factors and the development of snow mould.]—Ex *II. celost. bioklim. Konf., Liblice, 1958*, pp. 269–274, 2 pl., 1960. [Germ. summ. Abs. in *Landw. Lit. Tschechosl., 1960*, 2, p. 40, 1960.]

A description of the method and evaluation of the relations between incidence of seed infection by *Fusarium nivale* [*Calonectria nivalis*: cf. **37**. 344] and yield. It is concluded that incidence depends chiefly on the number of hr. with air R.H. $> 90\%$ in summer and on the number of days with complete but thawing snow cover in winter.

SURYANARAYANA (D.) **Perpetuation of the downy mildew of Maize (Sclerospora philippinensis Weston) on Kans (Saccharum spontaneum L.) in India**—*Curr. Sci.*, **30**, 3, p. 114, 1961.

Further study at New Delhi of this disease [cf. **36**, 241] which caused some 5% crop infection recently. The fungus is systemic in kans, and sporangia from kans infected maize.

FOCKE (I.) & FOCKE (R.). **Prüfung der Pythium-Resistenz beim Mais im Embryonentest.** [Examination of the *Pythium*-resistance of Maize in the embryo test.]—*Züchter*, **30**, 7, pp. 285–291, 1960. [36 ref.]

At the Inst. für Pflanzenzüchtung, Bernburg, German Acad. agric. Sci., Berlin,

shoots and adventitious roots were more resistant to *P.* spp. [cf. **35**, 672] than the main and lateral roots, and small unripe seed was more susceptible than ripe. Of 68 maize vars. tested, half-dent (mostly hard × dent) was the most resistant, hard maize and the starch vars. only slightly susceptible, sugar and puff maize highly susceptible, and dent usually highly so. The last tended to form adventitious roots early, thus enabling it to survive despite severe attacks. The dent × dent and hard × dent hybrids were superior to the better parent.

Ullstrup (A. J.). **Bacterial stripe of Corn.**—*Phytopathology*, **50**, 12, pp. 906–910, 2 fig., 1960.

Maize crops in Ind. were mildly affected by a hitherto undescribed bacterial disease in 1949, 1953, and 1958, and severely in 1957. Primary symptoms appear on the lower leaves as amber to olive-coloured, oil-soaked translucent lesions which elongate and may coalesce. In severely infected susceptible inbred lines the upper leaves may become bleached (secondary symptoms) and the internodes above the ear are distorted. *Pseudomonas andropogonis*, previously described as a pathogen of *Sorghum* [8, 440], was shown to be the causal agent and the disease was reproduced in field inoculations.

Illakowicz (A.). **Z badań nad gatunkami grzybów z rodzaji Fusarium występujących na ziarnach Kukurydzy (z lat 1956–57).** [Studies on fungus spp. of the genus *F.* occurring on Maize seeds.]—*Prace nauk. Inst. Ochr. Roś., Poznań*, **1**, 3, pp. 135–162, 13 fig., 1959. [Russ., Engl. summ. 34 ref.]

At Inst. Plant Prot., Reguły, Poland, 5 *F.* spp. were isolated from naturally and artificially infected maize seed as monospore cultures, viz. *F. nivale* [*Calonectria nivalis*] var. *majus*, not as yet recorded on maize, and *F. moniliforme* [*Gibberella fujikuroi*: cf. **40**, 301], new on maize in Poland, both of which also affected seedlings, and *F. solani*, its var. *redolens*, and *F. poae* [loc. cit.], which were non-pathogenic to seedlings. The need is emphasized for further study, in particular on the mutual symbiotic and antagonistic properties of *F.* spp. and on their relation to crops in rotation.

Shaskol'skaya (Mme N. D.). Идентификация мозаичной болезни Проса. [Identification of a mosaic disease of Millet.]—**Науч. Докл. высш. Школ.** [*Nauch. Dokl. vȳssh. Shkol.*], biol. Sci., *1961*, 1, pp. 103–109, 4 fig., 1961.

Symptoms on millet [*Panicum miliaceum*] leaves in the Kuĭbȳshev district in 1957–59 appeared as clear, yellowish-white, longitudinal streaks from 3–4 to 0·3–0·5 mm. wide. Where infection is severe 1 or 2 wide streaks develop on the lower leaves, sometimes coalescing and becoming necrotic; on the upper leaves streaks are narrower and sometimes 30–35 leaf. In mild attacks only the upper leaves are affected, with 1 or 2 wide streaks. Heavy infection retards growth and plants die within 18–20 days without flowering. With less severe infection, though growth is retarded, panicles are produced, but they are completely or partially sterile, small, and often emerge from the sheath with difficulty. Seed from infected plants also weighs much less.

The symptoms suggested a virus disease. In herbarium specimens needle-shaped crystals were detected under the microscope, externally similar to those from winter wheat infected by mosaic virus [**20**, 396], recorded in the same district. *Deltocephalus striatus* transmitted both viruses, which were related serologically [**37**, 528]. It is concluded that the millet disease is caused by winter wheat mosaic virus and that *P. miliaceum* is one of the fundamental links in a chain of hosts successively infected during the summer.

DZHURKOVA (OLGA). Нови гостоприемници на моравото рогче (**Claviceps purpurea Tul.**). [New hosts of ergot (*C. purpurea*).]—Раст. Защ. [*Rast. Zasht.*], **9**, 1, p. 45, 1961.

A list from the Central sci. Res. Inst. Plant Prot., [Sofia, Bulgaria], of 26 new hosts with locations and dates of collection.

TEMPLETON (G. E.), JOHNSTON (T. H.), & HENRY (S. E.). **Kernel smut of Rice.**—*Rice J.*, **64**, 2, p. 24, 3 fig., 1961.

In this further paper on *Tilletia* [*Neovossia*] *barclayana* [**40**, 465] it is stated that at the tip of the hyphae produced by the overwintering spore 40–60 fine, needle-shaped spores are formed, which after dissemination germinate and produce a mycelial mat on the surface of water. On this millions of sickle-shaped spores develop, which are forcibly discharged into the air and can become air-borne. Rice plants at the Main Exp. Sta., Fayetteville, Ark., exposed to showers of these spores as the florets were opening for pollination produced several smutted heads.

GONZÁLEZ-SICILIA DE J. (E.). **El cultivo de los Agrios.** [The growing of Citrus fruit.]—Madrid, Instituto Nacional de Investigaciones Agronómicas, xxiii + 806 pp., 14 col. pl., 142 fig., 9 diag., 3 maps, 1960.

This all-embracing tome has a section (pp. 661–685) on viroses and one (pp. 687–706) on fungus diseases, both with bibliographies, the former a long one. Use is made of material from all over the world, particularly U.S.A.

SALERNO (M.) & MAJORANA (G.). **Infezioni di 'psorosi B' (Citrivir psorosis var. anulatum Faw.) accertate sperimentalmente su piante di Arancio dolce (Citrus sinensis Linn.) in Sicilia.** [Infections by psorosis B (*Citrivir psorosis* var. *anulatum*) demonstrated experimentally on sweet Orange plants (*Citrus sinensis*) in Sicily.]—Reprinted from *Tec. Agric.*, **12**, 6, 11 pp., 5 fig., 1960. [Engl. summ. 18 ref.]

Symptoms of psorosis B virus [citrus psorosis virus str.], which are described, were found on Sanguinello moscato sweet orange in 2 orchards near Catania, Sicily [cf. **39**, 470 and below]. The condition was transmitted by chip-budding of Tarocco sweet orange.

MAJORANA (G.) & SALERNO (M.). **La 'psorosi a foglia bollosa' ('crinkly leaf psorosis'): malattia da virus osservata su piante di Limone (Citrus limon Linn.), in Sicilia.** [Crinkly leaf psorosis: a virus disease observed on Lemon plants (*C. limon*) in Sicily.]—Reprinted from *Tec. Agric.*, **12**, 5, 12 pp., 6 fig., 1960. [Engl. summ.]

In Feb. 1960 in Catania, Sicily, Femminello lemon trees grafted on sour orange bore symptoms of crinkly-leaf psorosis virus (str. of citrus psorosis virus) [cf. **37**, 476 and above]. The condition was readily transmitted by chip-budding to young Femminello lemon trees, Tarocco sweet orange, and sour orange, but no symptoms appeared on young Avana mandarin trees up to 8 months after inoculation.

MAJORANA (G.) & SALERNO (M.). **Due nuovi tipi di psorosi osservati su piante di Agrumi.** [Two new kinds of psorosis observed on Citrus plants.]—*Progr. agric.*, **7**, 1, pp. 89–95, 9 fig. (3 col.), 1961.

This information has been noticed [see above].

SCHÜEPP (H.). **Untersuchungen über Guignardia criticarpa Kiely, den Erreger der Schwarzfleckenkrankheit auf Citrus.** [Studies on *G. citricarpa*, the agent of black spot disease of Citrus.]—*Phytopath. Z.*, **40**, 3, pp. 258–271, 6 fig., 1 graph, 1961. [Engl. summ. 21 ref.]

A short historical review of the disease [**38**, 259], the symptoms and life cycle of

the fungus, its morphology, and systematic position are presented. At Univ. Pretoria, S. Africa, mycelium was found in the leaves and fruits, petioles, fruit stalks, twigs, and flowers from many parts of the Transvaal. Growth in culture was inhibited at pH $< 5\cdot5$ and nil at $< 2\cdot5$. In grafting experiments the mycelium spread from infected twigs to new parts of the plant. Good control is generally obtained by spraying with Cu compounds, though the fungus is usually present inside the tree. The fungicide does not appear to prevent the infection but to inhibit symptom expression.

[A shorter account appears in *Schweiz. Z. Obst. u. Weinb.*, **70**, 9, pp. 227–232, 3 fig., 1961.]

Prasad (N.) & Bhatnagar (G. C.). **Sphaeropsis knots on Lime (Citrus medica var. acida Linn.) in Rajasthan.**—*Curr. Sci.*, **30**, 3, pp. 110–111, 2 fig., 1961.

This first record of *Sphaeropsis tumefaciens* [cf. **27**, 564] from India includes a brief account of symptoms and of the fungus [map 386].

Klotz (L. J.). **Gum diseases of Citrus in California.**—*Circ. Calif. agric. Ext. Serv.* 396, 23 pp., 20 fig., 1960. [28 ref.]

A revision of the circular dealing with the etiology, symptoms, and control of gummoses and allied diseases of citrus in Calif. [cf. **30**, 34].

Flück (V.). **Über ein Infektionsverfahren mit Mycena citricolor.** [On an infection method with *M. citricolor.*]—*Phytopath. Z.*, **40**, 3, pp. 248–257, 1 fig., 1961. [Engl. summ.]

At the Biol. Inst. der Farbenfabriken Bayer, Germany, stilboids were formed in cultures of *M. citricolor* [cf. **38**, 745] on maltose-asparagine agar after 7–10 days in the dark at 20–25° C. and then 10–15 in the light. *Coleus* and coffee plants were inoculated by putting 15–30 stilboids on a filter paper ring (outside diam. 20 mm., inside 5) and inverting it on a leaf. The rings were saturated with water and moistened if necessary during incubation, when 100% R.H. and a temp. of 18–21° was maintained. Infection was successful on both attached and detached leaves. A method for calculating the disease index is described.

Reyes (T. T.). **Seed transmission of Coffee ring spot by Excelsa Coffee (Coffea excelsa).**—*Plant Dis. Reptr*, **45**, 3, p. 185, 1961.

At the Dept Plant Path., U.P. Coll. Agric., College, Laguna, Philippines, 9 of 103 seedlings from seed of Excelsa coffee with ring spot virus symptoms [**39**, 578] developed the disease. This is the 1st instance of seed transmission of a virus disease of coffee: results with virus-infected Arabica coffee were negative.

Rodrigues (C.). **Actividade do Centro de Investigação das ferrugens do Cafeeiro.** [Work of the Centre for Investigations on the rusts of Coffee.]—*Agricultura, Lisb.*, 6, pp. 38–44, 7 fig., 1960.

A general review of the work carried out at Oeiras, Portugal, in differentiating the physiologic races of *Hemileia vastatrix* and of the types of resistance found in the host [**39**, 707; cf. **40**, 169].

Wellman (F. L.). **Recomendaciones para mejorar el cultivo del Café en Puerto Rico.** [Recommendations for improving Coffee cultivation in Puerto Rico.]—*Bull. P.R. [ins.] agric. Exp. Sta.* 153, 113 pp., 32 fig., 1 graph, 1960. [82 ref.

Included in the section on diseases (pp. 78–84) [cf. **8**, 442] are: root rot (*Fusarium oxysporum* f. *coffeae*) [**27**, 472], to be controlled by developing resistant vars.; web blight (*Pellicularia koleroga*), controlled with Cu fungicides; leaf spot (*Cercospora coffeicola*) controlled similarly and moderated by shade; anthracnose (*Glomerella*

cingulata), controlled by attention to fertilizing and shade, and by sprays; American leaf spot (*Mycena citricolor*), controlled by Bordeaux mixture, COCS, perenox, or captan, used with stickers [cf. **37**, 354]; damping-off (*Rhizoctonia*); pink disease (*Corticium salmonicolor*); and trunk canker (*Ceratocystis fimbriata*) [cf. **39**, 579] controllable by shade reduction, use of herbicides instead of cutlass weeding to avoid damage, and treatment of cutting or pruning wounds with Bordeaux paste.

MEIFFREN (M.) & BELIN (M.). **Essai de traitement mixte insecticide et fongicide contre le Scolyte des rameaux du Caféier, Xyleborus morstatti Haged.** [Trial of mixed insecticidal and fungicidal control of the Beetle of Coffee branches, *X. morstatti*.]—*Café, Cacao, Thé*, **4**, 3, pp. 150–158, 4 fig., 1960.

In attempts to control the coffee canker in the Ivory Coast, caused by the beetle *X. morstatti* and associated with an unidentified moniliform fungus growing in the galleries and various fungi which develop in the canker after it has formed, viz. (in descending order of frequency) *Colletotrichum coffeanum* [*Glomerella cingulata*] *Pestalotia coffeicola*, *Botryodiplodia theobromae*, *Fusarium decemcellulare* [*Calonectria rigidiuscula*], and *F. lateritium* [*Gibberella lateritia*], 3 spraying experiments were conducted on Robusta coffee at Eloka in early and late 1959 and early 1960. In the 2nd dieldrin (1,200 g./ha.)+1·5% Bordeaux reduced the number of affected branches by 70·8%, while in the 3rd endrin+Bordeaux reduced it by 50%.

It is thought that Bordeaux may possibly have acted as a sticker for the insecticide. No control of *Glomerella cingulata* or *P. coffeicola* was obtained, but there was an effect upon the monilial fungus. Of 130 isolations from coffee treated with Bordeaux+dieldrin, 13 yielded the monilial fungus, compared with 67 for the untreated.

LOUÉ (A.). **Nouvelles observations sur les oligo-elements dans la nutrition du Caféier (Coffea canephora Pierre).** [New observations on minor elements in the nutrition of Coffee (*C. canephora*).]—*Café, Cacao, Thé*, **4**, 3, pp. 133–149, 4 pl. (2 col.), 8 graphs, 1960.

The results are presented of further field and laboratory investigations in the Ivory Coast into the Fe, Mn, Zn, B, and Cu content of the 3rd leaf (leaf diagnosis) of Robusta coffee in different localities and seasons [cf. **36**, 101]; 3,500 determinations were made on 800 specimens. The amount of each element present throughout the yr. is given for each region, with further details of the symptoms of B deficiency.

It is concluded that locally Fe deficiency is not of great importance; Mn deficiency is much more serious but toxicity is only limited; Zn and Cu can be deficient throughout the coffee-growing area, especially in sandy-argillaceous soil near the coast; while B deficiency appears to be of importance only during severe drought.

CAUQUIL (J.). **L'anthracnose du Cotonnier en Côte d'Ivoire.** [Cotton anthracnose in the Ivory Coast.]—*Phytiatrie-Phytopharm.*, **9**, 4, pp. 199–206, 1960.

The author (I.R.C.T., Station de Bonaké, Ivory Coast) states that during the past 5 yr. boll rot caused by *Colletotrichum* [*Glomerella*] *gossypii* [cf. **36**, 513] has caused important losses in northern parts of the area. Although the fungus is present throughout the country, it is of real economic importance only in the Boundiali Sector. From a study of the effect of the disease on yields, the manner of infection, foliage treatments with Cu and ziram, and var. resistance, it is concluded that the means of control are at present rather limited, and consist in phytosanitation, seed disinfection, insecticidal treatments to reduce secondary infection, the continued use of the Mono var. of *Gossypium barbadense*, and the increased planting of the Allen 333 var. of *G. hirsutum* [cf. below].

COGNÉE (M.). **Premières observations sur les fontes de semis de Cotonniers à la Station de Bambari.** [First observations on damping-off of Cotton at Bambari Station.]—*Phytiatrie-Phytopharm.*, **9**, 4, pp. 207–222, 1960. [19 ref.]

A careful study at the Station (Central African Republic, formerly Ubangui-Chari) of the fungi most commonly associated with damping-off of cotton seedlings locally [cf. below] is fully described. The fungi isolated from affected seedlings were *Alternaria macrospora*, *Botryodiplodia theobromae*, 2 spp. of *Colletotrichum*, *Fusarium moniliforme* [*Gibberella fujikuroi*: cf. **32**, 185], *F. oyxsporum*, *F. scirpi* var. *caudatum*, *F. solani*, *Glomerella gossypii* [cf. **37**, 409 and above], *Macrophomina phaseoli*, *Phoma* sp., *Pythium aphanidermatum*, *P. mammillatum*, *Rhizoctonia* [*Corticium*] *solani* [cf. **33**, 602], and *Sclerotium rolfsii*. Tests with some of these showed that the chief agent locally is *G. gossypii*, which invariably caused severe damage, even when the prevailing temp. was high, and was more frequently encountered than any other fungus; *Gibberella fujikuroi* (str. F) and *C. solani* were equally pathogenic but less so than *Glomerella gossypii*. Though some strs. of *Gibberella fujikuroi* were almost inactive some can cause death or stunting of seedlings. *P. aphanidermatum* is highly pathogenic, but usually before emergence.

Control depends on the manner of transmission. Seed treatment is effective for seed-borne fungi, but against soil-borne organisms, such as *C. solani* and *P. aphanidermatum*, direct control is usually impracticable.

Activité de l'I.R.C.T. 1957 ; 1958. [Work of the I.R.C.T. 1957; 1958.]—*Cot. et Fibr. trop.*, **14**, 2, pp. 83–321, illus., 1959; **15**, 2, pp. 151–365, illus., 1960.

In this report from l'Institut de Recherches du Coton et des Textiles exotiques, Paris [cf. **37**, 408], J. BOULANGER, C. POISSON, & H. BOULLAND (Bambari Station, Ubangui-Chari) record that Réba W. 296/7 cotton, almost immune from fusariosis (*Fusarium oxysporum* f. *vasinfectum*) [cf. below], gives yields at least as good as those of D9, while those of the tolerant B 1439 were definitely lower.

R. LAGIÈRE & M. COGNÉE state that up to 1956–7 about 500 lines homozygous for certain resistance factors against bacteriosis [*Xanthomonas malvacearum*: cf. **39**, 709] were selected and further improved by conferring 1 or more genes: B_2, B_1–B_2, B_2–B_3, and B_9–B_{10}, of which B_9 and B_{10} appear to be new; 121 lines homozygous for certain resistance genes were established. All the new Réba lines were resistant to *F.o.* f. *vasinfectum*. In a test in Alabama A. L. SMITH [**39**, 413] confirmed the resistance of Réba W. 296/7, though Allen A 150 and A 151 and Deltapine 15, tolerant in Ubangui-Chari, and Réba T.K./1 and Bobshaw, resistant there, were all susceptible in Alabama. In a seed and soil disinfection test the semi-wet treatment was not prejudicial to good germination. Granopera was again very effective. Dithane Z-78 added one day before sowing was phytotoxic to D9 plants, whereas zerlate slightly depressed emergence for a few days, but appeared to be very active against soil organisms impeding root development, treatment improving the growth of the plants.

In 1958 J. BOULANGER & H. BOULLAND concluded from varietal tests that the yield of Réba W.296 could be improved by making a 'bulk 1958' of high-yielding lines resistant to or tolerant of *F.o.* f. *vasinfectum* and having a fibre length of at least $1\frac{1}{16}$ in.

In dusting experiments with D9 seed agrosan 5W (0·18 and 0·32%), granosan M (0·18–0·3%), granopera (0·5%), sanigran (0·56%), urbasulf (0·8%), and panogen (pseudo-wet, 6 cc./kg.) all reduced seedling mortality equally and reduced by 98% primary infection by *X. malvacearum*. With the semi-wet treatment mercoran fixograin (14 ml./kg., 400 g./l.) gave fewer plants than panogen (6 and 11 ml.), granosan M (14 ml.), or granosan M–2X (10 ml.); all the treatments reduced mortality equally, all were highly bactericidal, and the best yields were given by panogen and agrosan 5 W (14 ml.) by both methods. Bactericidal activity was the

same whether a product was used wet or dry. In 2 yrs'. soil disinfection tests on seed beds formulae effective in one locality were ineffective in others. At Bambari soil disinfection appears to be useless, though in areas where cotton grows every year the problem may be different.

In selection work with Réba for resistance to *X. malvacearum* 400 lines from 45 hybrids of F_1–F_4 were spray-inoculated on 27–28 Aug., the incubation period was 7 days, and the results were noted on 8–16 Sept. In all, 114 pure homozygous lines were obtained, but by 1959 only 23 lines were left which were resistant to *X. malvacearum*, jassids, and *F.o.* f. *vasinfectum*, and these would constitute 16 'new Rébas'.

In selection for resistance to *F.o.* f. *vasinfectum* soil was inoculated at M'Boulo 3 days before and again at sowing, the seed was inoculated immediately before sowing, and the soil inoculated again 8 days later. In the greenhouse at Bambari seedlings were inoculated at 10–12 days (appearance of the 1st 2 leaves), using cultures on cassava stem; 2 diametrically opposite lesions were made in the hypocotyl 1 cm. below the cotyledonary node and the fungus introduced, the lesion being covered with cotton wool kept wet for 6 days. Symptoms became fully developed 10–12 days after inoculation, and the behaviour of the lines was assessed by (*a*) percentage of plants stunted; (*b*) average degree of severity of symptoms; and (*c*) amount of new growth present 5 days later. All the progenies which were to give new 1958–9 Rébas and most of the old ones were tested by this method. Three lines heterozygous for resistance to bacteriosis (18 strs.) were found, which will go into F_4. Of the old Rébas, 3 lines of Réba B. 50 3, 5 of Réba B 150 1, and 2 of Réba 28 1682 were resistant to fusariosis. Of Rébas still in process of selection, only lines resistant to or tolerant of fusariosis are being retained. At Bambari there exists a varied amount of hybrid plant material including a parent resistant to fusariosis. In the region of M'Bomou isolates of *F.o.* f. *vasinfectum* from affected plants belong to 2 different morphological forms, a mycelial (heavy growth in culture on sterile cassava stem) and, most often, a tuberculate (little mycelium, but numerous stilboid excrescences).

Miscellaneous records at Bambari included *Colletotrichum curvatum* on *Crotalaria mejusei*, *X. phaseoli* and *Colletotrichum lindemuthianum* on leaves and stems of *Phaseolus aureus*, a serious bacterial disease of *Cassia occidentalis*, and *Rhizoctonia bataticola* [*Macrophomina phaseoli*], *Cercospora coffeicola*, and *Colletotrichum coffeanum* on Excelsa coffee.

At Tikem Station, Tchad, in 1957 J. GUTKNECHT & E. BERNINGER inoculated cotton plants which had remained unaffected by *X. malvacearum* in a severely attacked planting and found them to be resistant; 35 lines were retained for selection in 1959.

A. LEUWERS (Section d'Expérimentation cotonnière, N. Cameroons) conducted experiments in 2 localities in 1957 which showed conclusively that mechanical delinting of cotton seed or dusting with 0·5% granopera gave better emergence, stand, and yield than no treatment while combined treatment gave better results than dusting without delinting. Delinting followed by dusting is highly remunerative, giving 10–35% increase in yield/ha.

In 1958 the experimental evidence indicated that dusting with 0·3% granopera can be carried out on non-delinted seed, the increase in yield then being comparable with that given by delinting; dusting delinted seed again increased yields by 10–30%. Granopera acts more on growth and boll-formation than on germination and stand.

L. COUTEAUX (Station d'Anie Mono, French Togoland) states that in 1957 4 hybrid strs. with an acceptable degree of resistance to *X. malvacearum* after 6 inoculations were retained.

J. LE GALL (Tadla Cotton Sta., Morocco) notes that the incidence of *Rhizoctonia* is sometimes high during the 1st fortnight in Apr., this being closely related to the

fact that the 1st irrigation is given early in Apr. Seedlings at the cotyledonary stage are very susceptible, and excessive irrigation then may cause seedling drop in ca. 90% of the drills. The presence of organic manure residues appears to aggravate an attack. Egyptian cotton is more susceptible than American.

Favoured by rain in Oct., *Rhizopus* destroyed nearly all the old bolls perforated by a late attack of *Earias*; *Platyedra* attack is seldom followed by *Rhizopus* and *Aspergillus*.

In mid-Apr. 1957 serious damage was caused to young, thickly planted cotton by *Alternaria macrospora*. Early in Nov. a new outbreak caused 50% defoliation. These late attacks do not affect yield.

Seed treatment with quintozene, alone or +captan, and zineb gave very satisfactory control of *Rhizoctonia* (natural soil infection). Better results would follow if soil infection and the development of the disease were made uniform (early irrigation).

Rain in mid-Apr. 1958 at Tala Sta. favoured the development of *A. macrospora* on young cotton leaves, especially on 1st emergent seedlings, up to 30% leaf-fall resulting. At the end of Oct. a further outbreak affected the plantings as a whole and caused generalized leaf-fall, which tended to favour boll ripening. *X. malvacearum*, endemic on the perimeter of the plantings, did not spread on cotton irrigated by gravity, though serious symptoms developed on sprinkler irrigated plants. In years favourable to infection the amount of water applied by sprinkler should be carefully controlled. In Sept.–Oct. a high proportion of the older bolls was completely destroyed by *Rhizopus* and *Aspergillus*; control of the Sept. generation of *Earias* is urgently necessary.

R. Delattre, J. M. François, & J. R. Razanamino (Tulear sect.) report that *X. malvacearum* was serious in 1957 owing to its immediate effect on the plants and its effect on the next crop through infected seed. Symptoms attributable to *Corticium* and *M. phaseoli* were severe locally.

P. Franquin (French Equatorial Africa, Madingou Sta., Middle Congo) records that in 1955–6, a slightly rainy yr., *Urena* plants (a jute substitute) were infected by *Macrophoma* [*Physalospora urenae*: cf. **37**, 409] to about 15% and the yield was 15 q./h. (20 q. in a good year). *Urena* is still grown under the threat of canker. The main factor in any outbreak is the amount of inoculum present and this can be reduced (possibly) only by long rotations. Any kind of soil can support an affected planting. A close correlation was established between yield and susceptibility. Var. DS 15 is reasonably tolerant and of av. yield, and DS 13 is high-yielding and not very susceptible. Plantings of DS15, DS2, DS1, and LS averaged, respectively, after 5 months, 5·2, 11·4, 13·4, and 18·4% infection. *U. lovata americana* (from Guadeloupe) is very tolerant but rather low-yielding.

M. Buffet (Bossangoa Sta. Central African Republic) states (1957) that Soumbe A 25 B 9 cotton, to be grown near Bouca, is resistant to *X. malvacearum* and high-yielding.

Lagière (R.). **Le flétrissement fusarien ou fusariose du Cotonnier dû à Fusarium oxysporum f. vasinfectum (Atk.) Snyd. et Hansen.** [*Fusarium* wilt or fusariosis of Cotton caused by *F.o.* f. *vasinfectum*.]—*Phytiatrie-Phytopharm.*, **9**, 4, pp. 223–226, 1960.

A brief account is presented of *F.o.* f. *vasinfectum* [cf. **40**, p. 108 and above], the part played by nematodes and by soil factors, the resistance of cotton plants to the disease, and methods of control. Growers are advised to plant resistant vars., to apply stable manure and K to the soil, and to practise rotation. In the Central African Republic, however, the last appearance of the disease was in 1950, and not all these steps are necessary; resistant vars. are available and it is hoped that the disease will soon cease to be of importance locally.

HUGHES (L. C.). **A visit to the United States Cotton Belt, September-October, 1960.** —*Emp. Cott. Gr. Rev.*, **38**, 2, pp. 119–126, 1961.

The author (Empire Cotton Growing Corporation, Namulonge, Uganda) states that in the American cotton belt boll rots [**40**, 225] cause considerable damage to lint, especially in the Mississippi Delta; a solution to the problem may be the transfer of an okra type leaf to commercial vars. Wilt (*F.* [*oxysporum* f. *vasinfectum*] and *Verticillium* [*alboatrum*]) [cf. **40**, 48, 416] is the most serious disease and all vars. must have considerable tolerance of it. Bacterial blight [*Xanthomonas malvacearum*: cf. **39**, 105, 172] is not generally so important: at least 5 races [cf. **38**, 407] are known. One var. resistant to race 1 becomes susceptible if soil N is very low, and plots of low fertility are sometimes used to differentiate between resistance genes. Farmers are said to find that applications of N reduce the risk of attack.

OSHANINA (Mme N. P.) & GUBANOV (G. Ya.). О поражаемости Хлопчатника фузариозным вилтом. [On the susceptibility of Cotton to *Fusarium* wilt (*F. oxysporum* f. *vasinfectum*).]—Хлопководство [*Khlopkovodstvo*], **11**, 1, pp. 36–39, 3 fig., 1 graph, 1961.

A growing exp. in 1959 at the Inst. for Cotton Selection and Seed-breeding, Uzbek Acad. agric. Sci., with the long staple cotton var. 5476–I showed that the severity and general level of infection by *F. oxysporum* f. *vasinfectum* [**40**, 417] were to a large extent dependent on soil inoculum in the pots. When the dose of inoculated oat medium was increased from 24 to 120 g. the final number of diseased plants rose from 50 to 100%. Max. susceptibility was apparent when the inoculum dose was changed from 24 to 96 g. To determine varietal reaction to changes in the level of soil inoculum 6 resistant and 4 highly susceptible vars. were grown in pots (70 seeds/pot) of soil at 65% moisture; inoculum doses were 45 and 115 g. per pot. In the resistant vars. infection was 7·8–41·9%, according to the charge of infection in the soil; with the susceptible it was 42·8–100%. Of the resistant vars., S-8017 had the highest resistance (7·8–21·9% infected) and S-6022 the least (14·5–41·9%). Resistant vars. 504-V and 9122-I were infected much earlier than the others, 10–22% of the plants showing infection 6–7 days after the appearance of the shoots. Plants remaining healthy maintained relatively high resistance to the end of the exp. S-8017 and 10964 developed infection later than the other vars. tested. When budding starts plants are more resistant to *F. oxysporum* f. *vasinfectum* and the disease developed more slowly than before budding.

BRINKERHOFF (L. A.) & HUNTER (R. E.). **Frequency of Cotton plants resistant to Fusarium wilt in some lines of Cotton resistant or susceptible to bacterial blight.** —*Plant Dis. Reptr*, **45**, 2, pp. 126–127, 1961.

When 2 cotton spp. of different reaction to bacterial blight [*Xanthomonas malvacearum*] were accidentally grown in a field infested with *F. oxysporum* f. *vasinfectum* [**39**, 413; **40**, 362], a higher % of plants resistant to wilt was found in cotton resistant to *X. malvacearum* than in the susceptible lines and further screening of blight resistant vars. for *F.* wilt resistance is recommended. The possible genetic association of these resistances is as yet undetermined.

INNES (N. L.). **Breeding bacterial blight resistant Cotton in the Sudan by combining greenhouse inoculation with field spraying.**—*Emp. Cott. Gr. Rev.*, **38**, 2, pp. 92–100, 2 pl. (4 fig.), 1 diag., 8 graphs, 1961. [18 ref.]

In further studies at Shambat Sta., Republic of the Sudan, on breeding for resistance to cotton black-arm (*Xanthomonas malvacearum*) [cf. **39**, 414; **40**, 362] needle inoculation [cf. **32**, 374] of the main vein of leaves of plants grown in the greenhouse proved useful in testing for the transfer of B_{6m} by itself and the accelerated transfer of B_2B_{6m}. It had also a limited application in differentiating between B_2 and B_2B_3

resistance. When a progeny is homozygous for either B_2 or B_2B_3 it is possible to determine by the mean lesion length whether or not B_3 is present as well as B_2. In a segregating progeny it is important to select plants of a specific genotype, and this is true also of the abrasion technique [**39**, 229].

Environmental changes appear to influence the difference between B_2 and B_2B_3 resistance. In the field B_2B_3 resistance is more effective than B_2 in preventing spread, and until B_2B_{6m} strs. are available for commercial production it remains important to secure max. B_2B_3 resistance. Work is in progress to this end.

Miličić (D.). **Sind verschiedene Eiweisskristalle der Kakteen Viruskörper?** [Are various protein crystals in Cacti virus particles?]—*Acta bot. croat.*, **18–19**, (*1959–1960*), pp. 37–63, 2 pl., 10 fig., 1960. [Croat. summ. 1½ pp. ref.]

After inoculation at Zagreb bot. Inst., Yugoslavia, of healthy *Epiphyllum bridgesii* with sap from infected plants of the same sp. and of *Opuntia inermis* from *O. monacantha* spindle-shaped protein particles formed in 6–10 days [**35**, 746]. Transmission by seed was not effected. Protein-containing rhombic plates in the leaf epidermis of *O. inermis*, barbed spheres in the cell sap of *O. monacantha*, and hexagonal crystals in the cytoplasm, nucleus, and sap of *O. tomentosa* were presumed independent of the virus.

Schindler (A. F.), Stewart (R. N.), & Semeniuk (P.). **A synergistic Fusarium-nematode interaction in Carnations.**—*Phytopathology*, **51**, 3, pp. 143–146, 1961.

At Beltsville, Md, carnations growing in soil inoculated with *F. oxysporum* f. *dianthi* [*F. dianthi*: **36**, 589] 1 week–5 months after application of 8 different parasitic nematodes developed more *F.* wilt than when the fungus alone was used.

Weintraub (M.) & Kemp (W. G.). **Protection with Carnation mosaic virus in Dianthus barbatus.**—*Virology*, **13**, 2, pp. 256–257, 1961.

In further studies [cf. **31**, 491] at Res. Sta., Vancouver, B.C., and Res. Lab., Ontario, evidence was obtained that it is very unlikely that the protection induced in *D. barbatus* by a localized infection with carnation mosaic virus is due either to a systemic infection by a low conc. of the virus or to a masked virus systemically invading the protected plant. The protecting factor is not transmissible to unprotected plants by sap inoculation or short contact in grafting, but is transmissible and induces protection when organic union is established between protected and unprotected plants.

Boerema (G. H.). **An underground attack of the rust Uromyces colchici on Colchicum in the Netherlands.**—*Tijdschr. PlZiekt.*, **67**, 1, pp. 1–10, 6 pl., 1961. [Dutch summ. 19 ref.]

The literature on this reputedly rare disease [cf. **39**, 183], discovered in the country in 1955 on Violet Queen, is discussed and the symptoms of diseased corms more fully described. Underground and above-ground infections are compared and an amplified description of the fungus given. The teleutospores are not smooth but minutely warted.

Desai (M. V.) & Patel (K. P.). **Leaf blight of Dracaena incited by Phyllosticta draconis.**—*Plant Dis. Reptr*, **45**, 3, p. 203, 2 fig., 1961.

Diseased *Dracaena* leaves at the Inst. of Agric., Anand, India, and also collected from Bombay, Poona, Bangalore, and Mysore, were found to be infected with *P. draconis* Berk.; *P. dracaenae* Griff. & Maubl. is probably a synonym.

Paulus (A. O.), Munnecke (D. E.), & Chandler (P. A.). **Diseases of Geraniums in California.**—*Leafl. Calif. agric. Exp. Sta.* 130, 2 pp. (folder), 5 fig., 1960.

Notes are given of the symptoms and control of bacterial leaf spot (*Xanthomonas*

pelargonii) [**35**, 189] of *Pelargonium*, 'cutting rot' (*Pythium* spp.), *Botrytis cinerea* blossom blight and leaf spot, *Alternaria* leaf spot, several virus diseases, and some minor diseases [cf. **39**, 317].

GERLACH (W.). **Über die Botrytis-Wurzelstockfäule der Iris und ihr Vorkommen in Deutschland.** [On *Botrytis* rhizome rot of Iris and its occurrence in Germany.] —*NachrBl. dtsch. PflSchDienst, Stuttgart*, **13**, 1, pp. 7–9, 3 fig., 1960. [Engl. summ.]

This seems to be the first recorded occurrence of the disease (*Sclerotinia convoluta*) [**24**, 58] in Europe, observed in 1956 at the Inst. für Mykologie, Berlin-Dahlem, on plants arriving by air from U.S.A. From spring onwards infected plants should be removed, together with the surrounding soil, and destroyed. Treatment of the rhizomes at transplanting, with preparations containing Hg, formalin, etc., may be effective when the soil is not infested.

THOMSON (A. D.). **Hydrangea ringspot virus in New Zealand.**—*N.Z.J. Sci.*, **3**, 4, pp. 559–562, 2 fig., 1960.

Hydrangea ring spot virus was isolated from 15 of 20 plants growing in 5 localities in N.Z. On the basis of serological tests and other properties the virus is considered to be closely related to that found in England [**38**, 86].

SCHREIBER (L. R.), FORDYCE (C.), & GREEN (R. J.). **Verticillium wilt of Sauce Magnolia, Magnolia soulangeana.**—*Plant Dis. Reptr*, **45**, 2, p. 108, 2 fig., 1961.

Isolations from a severely wilted 60-yr-old *M. soulangeana* tree at Purdue Univ., Lafayette, Ind., yielded *V. alboatrum*. Within 14 days the tree was completely defoliated and the buds were dead. Pathogenicity was established in greenhouse inoculations with young *M. soulangeana* plants. This is the 1st report of a *V.* wilt of a *Magnolia* sp.

HENNEBERRY (T. J.), TAYLOR (E. A.), SMITH (F. F.), BOSWELL (A. L.), & MCCLELLAN (W. D.). **Control of spider mites and black spot on Roses with acaricide-fungicide sprays and dusts.**—*J. econ. Ent.*, **54**, 1, pp. 61–63, 1961.

At the Agric. Res. Serv., U.S. Dept Agric., Beltsville, Md, *Diplocarpon rosae* on Red Radiance and Helen Traubel roses was effectively combated by maneb, zineb, ferbam, captan [cf. **39**, 318], S-Cu, and captan-S (especially the 2 1st-named) alone or in conjunction with aramite, demeton, or malathion for the control of *Tetranychus telarius*. The treatments prevented leaf damage and drop and increased the production of high-grade flowers. In general, there were no significant differences in efficiency between spraying and dusting.

ABE (T.) & NOZOE (S.). **On a Fusarium bulb-rot of Tulip.**—*Sci. Rep. Kyoto Univ. Agric.* 12, pp. 47–56, 1960. [Jap. Abs. from Engl. summ.]

A str. of *F. oxysporum* was isolated from rotted tulip bulbs [cf. **39**, 72, 176, 679]. Inoculation with 4 isolates of the pathogen caused a soft, fermenting bulb rot, and the leaves turned purplish after flowering. Isolates showed a range of pathogenicity on the bulbs, but were equally pathogenic to the leaves. The strs. used infected other liliaceous plants and those of other families. The most suitable method of control is to immerse the bulbs in 0·5% formaldehyde for 2 hr. at room temp.

Proceedings of the Eighth International Grassland Congress 1960.—764 pp., 3 fig., 150 graphs, 2 maps, Grassland Res. Inst., Hurley, Berks, 1961.

Diseases of herbage plants were discussed during session 8A (pp. 194–211) of this congress, held at the Univ. Reading, England, 11–21 July, 1960.

E. A. JAMALAINEN. **Low-temperature parasitic fungi of grassland and their**

chemical control in Finland. (pp. 194–196) [Engl., Fr., Germ. summ.] Cereals and grasses are severely damaged during the winter by *Typhula idahoensis*, *T. itoensis*, *Fusarium nivale* [*Calonectria nivalis*: **39**, 569], and *Sclerotinia borealis*; and clover by *S. trifoliorum* [**38**, 701]. In field trials the yield of red clover was increased 32% (av. of 36 tests) by quintozene at 4–5 kg./ha. in late autumn. Winter cereals, and grasses in preliminary trials gave considerably increased yields when treated with quintozene phenyl Hg acetate, and phenyl Hg salicylate.

J. B. Lebeau. **Resistance of legumes and grasses to low-temperature organisms.** (pp. 197–200; 1 fig.) [Engl., Fr., Germ. summ.] At the Canada Dept Agric. Res. Sta., Lethbridge, Alta, the crowns of lucerne plants resistant to the low-temperature basidiomycete [**39**, 26; **40**, 368 and below] overwintered with a higher ratio of dormant to active buds than the crowns of susceptible plants, and survived better following exposure to HCN produced by the fungus. The QO_2 values of resistant lucerne crowns at 2° and 15° C. were lower than for susceptible crowns. It is suggested that the physiologic reactions of lucerne to freezing and to the pathogen are similar.

A. J. H. Carr. **The significance of virus diseases in herbage crops.** (pp. 200–204; 1 fig.) [Engl., Fr., Germ. summ.] The incidence of phyllody, witches' broom, and red leaf viruses in clover and cocksfoot streak [in *Dactylis glomerata*: **40**, 6], their effect on the host, and on the crop are discussed. Clover buds infected by phyllody virus contained a high conc. of growth hormones.

L. Quantz. **Investigations on virus diseases of leguminous forage crops in Germany.** (pp. 204–207) [Engl., Fr., Germ. summ. 26 ref.] The viruses occurring on pasture and forage legumes in Germany include pea leaf roll [**35**, 649], broad bean true mosaic [**39**, 139], bean yellow mosaic, common pea mosaic, pea enation mosaic, red clover vein mosaic, white clover mosaic [**40**, 173], lucerne mosaic, and pea streak. Some observations are included on the epidemiology of the 3 pea viruses.

L. Bos & J. P. H. Van der Want. **Legume virus research in the Netherlands with special reference to forage crops.** (pp. 207–210) [Engl., Fr., Germ. summ. 15 ref.] Following a review of work on the viruses of red clover vein mosaic [**39**, 290], pea leaf roll [**37**, 748], white clover mosaic, and white clover witches' broom [**39**, 290] and their control at the Inst. for Phytopath. Res., Wageningen, the importance of international cooperation in legume virus research is emphasized.

Ward (E. W. B.), Lebeau (J. B.), & Cormack (M. W.). **Grouping of isolates of a low-temperature basidiomycete on the basis of cultural behaviour and pathogenicity.**—*Canad. J. Bot.*, **39**, 2, pp. 297–306, 1 pl. (4 fig.), 1961. [14 ref.]

At the Canad. Dept Agric., Edmonton and Lethbridge, Alta, and Saskatoon, Sask., isolates of the low-temperature basidiomycete associated with snow mould of turf and lucerne [cf. above] fell into 3 groups on the basis of cultural appearance. Type A isolates grew slowly, were intolerant of temp. and pH extremes, produced HCN on the host but not in culture, were highly pathogenic to lucerne, and moderately so to grass. Isolates of type B grew more rapidly than type A and tolerated a wider pH range; they were as pathogenic to grass as type A, but less so to lucerne, and produced smaller amounts of HCN on the host but a large amount in culture. Type C isolates were non-pathogenic and did not liberate HCN in culture.

Müller (G.). **Über die Identität von Trichosporon behrendii Lodder et Kreger-van Rij, 1952 mit Trichosporon variabile Delitsch, 1943 — Monilia variabilis Lindner, 1898.** [On the identity of *T. behrendii* with *T. variabile* — *M. variabilis*.]—*Zbl. Bakt.*, Abt. 2, **114**, 2, pp. 184–191, 4 fig., 1961. [21 ref.]

From observations on isolates from mouldy fodder at the Institut für Mikrobiologie der Humboldt Universität, Berlin, and a study of the literature the author

concludes that *T. behrendii* is identical with *T. variabile* (*M. variabilis, Oospora variabilis*, and *Candida variabilis*) [**36**, 202 and below].

MÜLLER (G.). **Mikrobiologische Untersuchung über die 'Futterverpilzung durch Selbsterhitzung'. I. Mitteilung: Orientierende Untersuchung eines laboratoriumsmässig angesetzten Schimmelfutters.** [Microbiological study of the fungal contamination of fodder through self-heating. Note I: exploratory study of a mouldy fodder prepared by laboratory methods.]—*Zbl. Bakt.*, Abt. 2, **114**, 2, pp. 192–202, 5 fig., 1961.

Among 26 isolates from a mixed fodder for pigs were 15 yeasts; *Candida krusei, Endomycopsis fibuliger, Pichia farinosa, Hansenula anomala*, and *Trichosporon variabile* [see above] predominated, also *Mucor* sp., *Botrytis* sp., and *Graphium* sp. None of the organisms destroyed cellulose and their proteolytic activity was slight.

GOULD (C. J.), GOSS (R. L.), & MILLER (V. L.). **Fungicidal tests for control of Fusarium patch disease of turf.**—*Plant Dis. Reptr*, **45**, 2, pp. 112–118, 1961.

The results of 11 field trials at Wash. agric. Exp. Sta., Puyallup, are detailed and summarized. It was concluded that the best control of *Fusarium nivale* [*Calonectria nivalis*: **34**, 790; **37**, 50] on lawns was given by 10% phenyl mercury acetate (PMA) at $\frac{3}{4}$ oz./10 gal./1,000 sq. ft. alternated with cadmium chloride (1 oz. 20% soln.) because of the phytotoxicity of PMA which may be reduced by $\frac{1}{8}$ lb. N as ammonium or $CaNO_3$. These treatments should be bi-weekly in the spring and autumn and monthly during the rest of the year, with adjustment as weather conditions may or may not favour the disease.

BRAVERMAN (S. W.). **Three additional Bromegrass species as hosts of Helminthosporium sorokinianum (H. sativum).**—*Plant Dis. Reptr*, **45**, 3, p. 199, 1961.

H. sativum [*Cochliobolus sativus*] was isolated from *Bromus brevis, B. tomentosus*, and *B. frondosus* at Geneva, N.Y., in 1960 [cf. **39**, 419].

LUTTRELL (E. S.) & CRAIGMILES (J. P.). **Control of head smut in Rescue Grass.**—*Plant Dis. Reptr*, **45**, 3, pp. 216–218, 1961.

At Ga Exp. Sta., Experiment, treatment of *Bromus willdenovii* [*B. catharticus*] seed with ceresan, panogen, or dichlone gave complete control of *Ustilago bullata* [**36**, 324; **37**, 731]. Lamont, Nakuru, Prairie, and Georgia were highly resistant to inoculation.

MIŠIGA (S.), MUSIL (M.), & VALENTA (V.). **Niektoré hostitel'ské rastliny vírusu zelenokvetosti Ďateliny.** [Some host plants of strawberry green petal virus.]—*Biológia, Bratislava*, **15**, 7, pp. 538–542, 3 fig., 1960. [Russ., Germ., Engl. summ.]

In experiments with 2 strs. at the Czechoslovak Acad. Sci., Bratislava, transmission [cf. **39**, 450, 611; **40**, 268] was effected by leafhoppers (*Aphrodes bicinctus* and *Euscelis plebejus*), dodder (*Cuscuta campestris* and *C. subinclusa*), and by grafting to red, white, and alsike clovers, broad bean, *Vinca rosea*, tomato, tobacco, *Nicotiana rustica, Datura stramonium, Senecio vulgaris, Calendula officinalis, Chrysanthemum carinatum*, and dandelion.

ANKE (M.), GRAUPE (B.), & TROBISCH (S.). **Molybdänmangel bei Luzerne, Rot- und Schwedenklee.** [Mo deficiency in Lucerne, Red, and 'Swedish' Clover.]—*Dtsch. Landw., Berl.*, **5**, 4 pp., 3 fig., 1960.

Application of fertilizer near Arnstadt, E. Germany, revealed that Mo deficiency is a frequent cause of poor growth in these plants [**38**, 67], particularly in acid soil. Vetch and white and yellow clover seem to need little if any Mo. The deficiency can be corrected by applying 2 kg. Na molybdate/ha. and by liming acid soil.

Bordewick (B. E.). **Studies of maintenance of virulence of Corynebacterium insidiosum (McCull.) H. L. Jens. in culture and the inheritance of resistance to C. insidiosum in diploid Medicago falcata L.**—*Diss. Abstr.*, **21**, 5, p. 1016, 1960.

Cultures of 2 isolates differing in virulence were maintained at Purdue Univ., [Ind.], for 20 months in test tubes. Virulence was measured by the severity of symptoms in inoculated plants of the susceptible lucerne var. Narragansett. The more virulent isolate remained virulent 3–6 months longer than the less virulent. Cultures at 5° C. retained virulence 3 months longer than at 24° and 3–6 months longer than at −30°. At 5° cultures on lucerne agar and potato dextrose agar (pda) +safranin retained virulence about 3 months longer than those on pda. Virulence was retained 3–6 months longer under oil. Both highly and weakly virulent cultures formed round, smooth, flat, pink colonies as seen by obliquely transmitted light. No differences in amino compounds were noted between extracts of the 2 cultures.

Resistance to bacterial wilt in diploid lucerne is controlled by multiple genes. Resistance or susceptibility genes can be accumulated. The progenies from backcrosses to a susceptible parent were largely susceptible and those to a resistant parent largely resistant.

Sasaki (Y.) & Yoshida (T.). **Distribution and classification studies on the wild yeasts or budding fungi on the fresh fruits in Hokkaido.**—*J. Fac. Agric. Hokkaido Univ.*, **51**, 1, pp. 194–220, 6 pl., 1959.

In all, 272 isolates, 9 from cherries, 27 from strawberries, 191 from early and late apples, and 45 from grapes were studied. The fact that some strs. are distributed in limited areas suggests an interesting connexion between the distribution of wild yeasts and the climate, character of soil, season, and the kind of fruit.

Sun (Y.-W.). Садоводство северо-западного Китая. [Fruit-growing in north-west China.]—135 pp., illustr., Moscow, Sel'khozgiz, 1959. Roubles 1.70. [Transl. from Chinese.]

A brief section on the 'Control of diseases and pests of fruit crops' (pp. 117–121) includes a table on the use of chemicals for control. Among the most common diseases [listed] in the area are *Podosphaera leucotricha* on apple [map 118], *Venturia pirina* and *Bacillus amylovorus* [*Erwinia amylovora*: map 2] on pear, *Taphrina deformans* and *Bacterium pruni* [*Xanthomonas pruni*: map 340] on peach, *Clasterosporium carpophilum* [map 188] on apricot, and *Sphaceloma* [*Elsinoe*] *ampelina* [map 234] on vine.

Vitanov (M.). Ранно кафяво гниене по овощните дървета и борбата с него. [Blossom wilt and early brown rot on fruit trees and its control.]—Овощарство [*Ovoshtarstvo*], **8**, 3, pp. 20–24, 2 fig., 1961.

This disease (*Monilia* [*Sclerotinia*] *laxa*) [cf. **38**, 369; **39**, 151] was studied by Dryanovo exp. Sta. Fruit-growing, Bulgaria. Wilting of shoots and flowers was most severe on Ungarska apricot (45–50% incidence in the Varna area), morello cherry, and the Zhŭlt belfl'or apple, and fruit rot on a number of cherry and morello cherry vars. and on many plums. To induce fruit rot infection is believed to gain entry through skin injuries, insect wounds, apple and pear scabs [*Venturia inaequalis* and *V. pirina*], and shot-hole of stone fruits [*Clasterosporium carpophilum*]. Differential symptoms of the early and the late brown rot (*M.* [*S.*] *fructigena*) [loc. cit.] are indicated. In addition to recommending elevated and windy sites for orchards and normal phytosanitary precautions, winter spraying is advocated with chemicals containing DNOC, spring spraying with 1% selinon, and (except peach) before and during flowering with 1% Bordeaux mixture, of peach with 0·3%

captan or 0·3% aspor, and of other stone fruit with 0·25% captan, 0·2% aspor, or colloidal S.

Notes on research and investigation.—*Orchard.*, *N.Z.*, **34**, 2, p. 68, 1961.

The Fruit Res. Sect. Div. and Plant Diseases Div. report that willow leaf, a minor plum disorder 1st reported from New Zealand in 1957, has now been found on apples. Rubbery wood virus [**39**, 234] is carried by apple throughout New Zealand orchards without visible symptoms. Tests have begun of all the selected budwood trees to find out what latent viruses are present. Cu oxychloride trials to control collar rot [*Phytophthora cactorum*: **39**, 719] at Nelson have proved disappointing: of trees healthy at the start, 13% that received the highest application of 4 lb. in 1957 have since become infected, compared with 17% of untreated. At Blenheim 2 of 8 treated trees have been attacked.

Reeves (E. L.) & Lindner (R. C.). **Some Apple virus disease problems in Washington.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), pp. 117–119, 2 fig., [1960].

Serious losses were caused in north central Wash. in 1959 by russet ring virus disease. Symptoms of stem pitting virus disease [**40**, 313] were noted on 2 trees in 1958 and on several in 1959. Vars. on seedling roots appear to be little affected. Stem pitting was found on trees with symptoms of other virus diseases. Symptoms are expressed on body stocks such as Virginia Crab when top-worked with virus-infected symptomless vars. or where infected Virginia Crab is used as a body stock in developing nursery trees.

Trees in 2 orchards near Wenatchee appeared to be affected by rubbery wood virus [map 305].

Schmid (G.). **Weitere Beobachtungen über viröse Berostung und Rissbildung an Äpfeln.** [Further observations on virus russeting and cracking of Apples.]—*Schweiz. Z. Obst. u. Weinb.*, **70**, 2, pp. 32–35, 3 fig., 1961.

In further studies [**39**, 592] the virus was found to be transmissible 5 yr. after grafting to vars. which had not previously shown symptoms, i.e. from infected Glockenapfel to healthy Boskoop and vice versa, from Boskoop to Jonathan, and from Glockenapfel to Weinapfel. Again, symptoms differed on individual vars. It is now thought that russeting on Boskoop and star crack [**40**, 418] on Glockenapfel are caused by the same virus, but that transmission between these vars. takes much longer than that between the same or 'related' vars.

Welch (M. F.) & Keane (F. W. L.). **The virus disease 'leaf pucker' of Apple and associated fruit symptoms.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), pp. 114–116, 3 fig., [1960].

On apple trees affected by leaf pucker virus disease [**37**, 359], examined by Canada Dept Agric. Res. Sta., Summerland, B.C., leaves formed after the onset of hot weather had no symptoms. On McIntosh trees the fruits commonly bear small depressions, within which the skin is abnormally pigmented, accompanied on some fruits by superficial ring russet patterns [cf. below].

In 1959 leaf pucker symptoms were noted on Yellow Newtown, Blaxtayman, and Jubilee, in the 1st of which they were accompanied by 2 types of fruit symptom. In some orchards leaves with mild symptoms accompanied fruits with elaborate networks of ring russeting: in another a tree displayed more severe leaf symptoms, with dwarfed, distorted fruits, most of the surface of which bore purple patches, sometimes accompanied by large, expanded cracks. In Blaxtayman the fruit symptom is a large superficial purple to brown skin blotch not associated with russeting. Jubilee fruits have less extensive purple skin blotches.

When Spartan trees were inoculated with infected material from McIntosh, emergence from dormancy was delayed for 4–5 weeks, and this was succeeded by a limited die-back of terminals; there was also a severe reduction of fruit set.

During 6 seasons' observations of affected McIntosh trees, no fruit symptoms were apparent in seasons characterized by an early onset of warm, sunny weather; foliage symptoms appeared only on the first-formed leaves. In a cool, dull summer the symptoms were visible on most fruits of affected trees and on most of the leaves formed during the 1st half of the season. The ring russet symptoms on Yellow Newtown vary from season to season and in some years are absent.

STARCHER (D. B.). **The economic importance of russet ring on Golden Delicious Apples.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), pp. 120–121, [1960].

Russet ring virus disease [cf. **37**, 240; **39**, 592 and above] appears on Golden Delicious fruit while it is still small and reddish as a slightly sunken, white or pale green ring. Later, surface russeting appears as irregular rings on the developing fruit. The condition is present in over 40 orchards in Chelan, Douglas, and Okanagan counties, Wash., and there are probably over 1,000 affected trees in the north central area. A very light russeting early in the season will continue to develop during the 50–60 days preceding harvest, thus reducing fruit grade. The virus is transmissible by grafting or budding.

REEVES (E. L.) & CHENEY (P. W.). **Russet-ring, a graft transmissible disease on Golden Delicious Apples.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), pp. 157–158, 2 fig., [1960].

In May 1955 a Golden Delicious apple tree near Wenatchee, Wash., was found bearing some malformed leaves with chlorotic spots and patterns and a few fruits with slightly depressed areas near the calyx end. Spur and bud material was budded in Sept. 1955 onto a healthy Golden Delicious tree in an experimental plot, and in May 1958 about 20% of the foliage on the inoculated tree showed symptoms identical with those on the affected tree. Foliage symptoms were again apparent on both trees in early June 1959, and a few fruits on each were distorted near the calyx end. In early July 1959 a russeting of the fruit surface developed as irregular rings [cf. above] with a centre relatively free from russet. The russeting became more marked by the end of July, many fruits being damaged severely enough to prevent high grading.

The smaller spur leaves were typically distorted, with chlorotic areas and flecking, particularly along the midrib. The larger leaves bore variable chlorotic areas along the midrib and some marginal puckering similar to that reported by Welsh and Keane [**37**, 359].

All trees with affected fruits examined over 10 yr. also had malformed leaves with chlorotic spots and patterns like those on the leaves of the tree from which inoculum was taken in 1955. It has not been proved, however, that the fruit and foliage symptoms are caused by the same virus.

Observations in several orchards during July–Sept. 1959 showed that only Golden Delicious had russeted fruit. Foliage symptoms were present on Rome and Staymen Winesap.

WELSH (M. F.) & KEANE (F. W. L.). **Transmissible decline diseases of Apple.**—Abs. in *Phytopathology*, **51**, 1, pp. 67–68, 1961.

Several distinct diseases are involved in decline of apple in B.C., including stem pitting, delayed dormancy and dieback of Spartan, decline of Spy 227 [**40**, 175], reduced scion take in crab apple vars., weakening and death of Virginia crab, and decline of Hyslop crab [**40**, 113].

Reynolds (J. E.) & Milbrath (J. A.). **Flowering crab Apple varieties as quick indicator hosts for latent Apple viruses.**—Abs. in *Phytopathology*, **51**, 1, p. 67, 1961.

In west Ore. several vars. of flowering crab, including Hopa, give promise as rapid indicators for latent viruses [cf. **40**, 313].

Torgeson (D. C.) & Lindberg (C. G.). **A greenhouse method for evaluation of chemicals to control Apple powdery mildew.**—*Contr. Boyce Thompson Inst.*, **21**, 1, pp. 33–34, 1961.

A continual supply of young, actively growing apple shoots for inoculation with *Podosphaera leucotricha* in year-round spraying trials was obtained by planting out McIntosh apple seedlings with 2–4 true leaves in $3\frac{1}{2}$ in. pots [cf. **38**, 703]. Plants may be re-used by cutting back to 1 or 2 buds and allowing 1 shoot to develop. Mites and *P. leucotricha* were controlled by growing plants in a fine water mist, and aphids by malathion sprays.

Chemicals were evaluated as either protectants or as eradicants (used 10 days after exposure to mildew spores). Plants are rated from 1 (no control) to 5 (complete control). Experience has shown that results are comparable with those obtained in the field.

Croxall (H. E.). **Apple mildew.**—*N.A.A.S. quart. Rev.*, **51**, pp. 121–125. 1961. [14 ref.]

A useful review of the disease (*Podosphaera leucotricha*) [**40**, 478] in Britain, its life history, control by spraying and pruning, and the losses caused by it.

Baker (June V.). **A method of assessment of Apple powdery mildew.**—*Plant Path.*, **10**, 1, pp. 32–37, 1 graph, 1961.

Using this method to assess damage caused by *Podosphaera leucotricha* [**38**, 89; **40**, 369] in E. Anglia the author found it necessary to relate symptom expression in the current season to that in the previous and subsequent years and to make sample observations in spring (on shoots and flower trusses), early summer (leaves and shoots), and autumn (shoots and spur buds). The procedure is outlined in detail, with the keys used for assessing various percentages of mildew. Difficulties encountered are noted and examples given of some of the records obtained.

Sprague (R.). **Control of Apple powdery mildew at Wenatchee.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), p. 19, [1960].

At the Fruit Tree Exp. Sta., Wenatchee, Wash., Black Jonathan apple trees sprayed in Apr.–May 1959 with karathane+plyac or +ortho spray ($\frac{3}{4}$ lb.+4 oz./100 gal.), polysulphide compound (4, $3\frac{1}{2}$, & $2\frac{1}{2}$ lb.), karathane EC ($\frac{3}{8}$ pint) alone or +plyac, +B 1956, or +rhoplex ($\frac{1}{4}$ pint+4 oz.), and Niagara 5943 ($\frac{1}{2}$ lb.), all had under 1% fruit russeting caused by mildew [*Podosphaera leucotricha*: cf. **39**, 594 and below], as against 18·7% for the untreated.

Sprague (R.). **Controlling mildew on Apples at Wenatchee, Washington in 1960.**—*Plant Dis. Reptr*, **45**, 2, pp. 106–107, 1961.

Against the worst mildew (*Podosphaera leucotricha*) infection since 1948 [cf. above] the most promising control was given by phytopabst AL 307 (a polypeptide antibiotic derived from *Streptomyces*; 1 qt./100 gal. applied 9 and 19 May, 1 June), DY-Q-Plex-1 (a copper hydroxide complex; $\frac{1}{2}$ lb./100 gal. applied 6 July, 5 Aug.), and 06K-50W (2-amino-3 chloro-1,4 napthoquinone; 1 lb./100 gal. on 10 June). Other chemicals giving good control proved too phytotoxic.

Burchill (R. T.) & Edney (K. L.). **The assessment of spore production by Gloeosporium album and its relation to fruit infection.**—*Rep. E. Malling Res. Sta., 1960*, pp. 90–93, 1961.

Measurements of spore populations of *G. album* [*Pezicula alba*] in an orchard of Cox trees from Apr. 1959–Mar. 1960 [**39**, 651] showed that the spores are dispersed throughout the year, with max. discharge in the autumn. Samples of fruit continuously exposed or protected by polythene bags for various periods were collected at intervals during the growing season and stored at 12° C. These and other samples infected artificially demonstrated that the incidence of rotting was determined more by the maturity of the apples than by the quantity of inoculum to which they were exposed.

Edney (K. L.), Austin (W. G. L.), Corke (A. T. K.), & Hamer (P. S.). **Effect of winter spraying on rotting of stored Apples by Gloeosporium spp.**—*Plant Path.*, **10**, 1, pp. 10–13, 1961.

Cox's Orange Pippin and Seedling Crab trees were sprayed (trial 1) with 5% tar oil or a proprietary phenyl Hg compound (0·1% Hg) in Feb. 1957; (trial 2) with tar oil in Feb. 1957, Hg in Feb. 1958, or with Hg on both dates; (trial 3) with Hg in Nov. 1957 or Feb. 1958 or on both dates; apples picked in both years in mid-Sept. were stored at 38° F. and inspected at intervals up to 20 Jan. 1959. In trials 1 and 2 rotting by *Gloeosporium* [*Pezicula*] spp. [cf. **38**, 608, 755, *et passim*] was significantly less after Hg treatment at all inspections, though in trial 3 control was evident at the final date only from the Nov.+Feb. sprays.

The evidence suggested that control measures satisfactory in a dry year may prove less effective in a wet one. Control could be improved by more effective treatment during dormancy or by the use of additional sprays when necessary during the growing season. The ability of Hg at < 0·1% to given control is being assessed.

Schmidle (A.). **Prüfung einiger Apfelstammbildner auf ihre Anfälligkeit für die Kragenfäule (Phytophthora cactorum (Leb. et Cohn) Schroet.).** [A test of some Apple stem scions for susceptibility to collar rot (*P. cactorum*).]—*Erwerbsobstbau*, **2**, 9, pp. 169–171, 1960.

Of many intermediate scions grafted at the Inst. für Obstkrankheiten, Heidelberg, Germany, on < 5-yr.-old M IX, M VII, and M IV stocks with Cox's Orange or Berlepsch tops, Maunzen was the most resistant to inoculation with 3 virulent strs. of *P. cactorum* [cf. **39**, 328]. Longitudinal necroses, mostly under 22 mm., healed during the growth period. Peasgood and Danziger Kant were also resistant.

Pfulb (K.). **Stopping intense symptoms of potassium deficiency in young trees by fertilizing.**—*Kali-Briefe*, **10**, 2, pp. 1–6, 1961. [Germ. *Chem. Abstr.*, **55**, 8, col. 7738 g, 1961.]

At Landwirtschaftliche Versuchsanstalt, Augustenberg, Baden, Germany, liquid applications of K to apple and pear trees on alluvial meadow soil containing clay were a better corrective of deficiency than dressings of the salt; K content of the leaves was increased by over 100%, but was still < 1% in dry matter. Double amendments of 530 kg./ha. pure K_2O salt did not enrich the 20–30 cm. layer of soil, whereas liquid treatments raised the K level from 7 to 9 mg./100 g.

Sprague (R.). **Apple scab sprays for 1960 in North Central Washington.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), pp. 17–18, [1960].

The results are given of spraying in the spring of 1959 against apple scab [*Venturia inaequalis*] at Tree Fruit Exp. Sta., Wenatchee, Wash., and in neighbouring commercial orchards with cyprex [cf. **38**, 386]. The paper concludes with recommended schedules [**40**, 54] in relation to rainfall conditions.

BLUMER (S.). **Obstbaumkrebs, Rindenbrand und Fruchtfäule.** [Fruit tree canker, bark scorch, and fruit rot.]—*Schweiz. Z. Obst. u. Weinb.*, **69**, 24, pp. 547–551, 2 fig.; 25, pp. 580–586, 5 fig., 1960.

At Wädenswil, Switzerland, some hundred canker lesions on apple and pear trees were examined and a number of fungi were isolated. In 1959 the relatively resistant Schneiderapfel and the susceptible Golden Pearmain apple trees were inoculated with mycelium from agar cultures, the inoculation sites being covered for 4 weeks with strips of 'stericrepe'. Re-isolations 4–9 months later indicated infection only by *Pezicula malicorticis* [**40**, 314] (the most aggressive), *P. alba* [**39**, 475], and *Nectria galligena* (the least), all 3 producing longer lesions on the susceptible var. Uninjured tissue is not infected; inoculation was most successful on cut surfaces and on tissue injured with pliers, less so on branch scars. Leaf scar inoculation proved 50% effective and the scars represent natural entry points for the pathogens. Infection was best in autumn and winter.

BUSHONG (J. W.) & POWELL (D.). **Results of preliminary tests with phenacridane chloride for the control of fireblight of Apple and bacterial spot of Peach.**—*Plant Dis. Reptr*, **45**, 2, pp. 100–101, 1961.

Natural twig blight infection caused by *Erwinia amylovora* on apple at Univ. Ill., Urbana, was controlled by 7 applications of phenacridane chloride [**40**, 196] at 100, 200, and 400 p.p.m. at 8–12 day intervals. Bacterial spot (*Xanthomonas pruni*) on inoculated peach trees was reduced by similar applications. At the concs. used phenacridane chloride acted as a protectant rather than an eradicant and was not phytotoxic.

BLODGETT (E. C.). **Observations on Pear decline in 1959.**—*Proc. Wash. St. hort. Ass.*, **55** (*1959*), pp. 85–86, [1960].

In 1951 quick decline of apparently healthy trees complicated the decline problem [**40**, 369, 479] in Washington, where both the quick and the slow forms have since increased alarmingly. In 1959 examination by the Wash. State Dept Agric. of a number of 1- and 2-yr.-old trees which suddenly wilted and died showed that in many a brown discoloration was present in the phloem; affected trees also had a non-functioning root system. Of the 20 trees found dying, all were on *Pyrus ussuriensis* or *P. serotina* roots.

On a visit to Calif. the author found that there appears to be no essential difference between pear collapse in that State [loc. cit.] and quick decline in Wash.

VITANOV (M.). Червени листни петна по Сливата и борбата с тях. [Red leaf spot of Plum and its control.]—Овощарство [*Ovoshtarstvo*], **8**, 4, pp. 23–27, 1 fig., 1961.

At the Dryanovo Fruit Res. Sta., Bulgaria, some control of the leaf spot of plum caused by *Polystigma rubrum* [cf. **39**, 478] was obtained by the hyperparasitism of a *Gloeosporium* sp. and by *Trichothecium*. Good control was achieved by tilling after leaf-fall, winter sprays of 1% selinon, and sprays before flowering of 2% and after flowering of 1% Bordeaux mixture. Two applications of aspor and dithane 65 (both at 0·2%), 1 early during flowering and 1 after, were 100% effective, but correct timing of all sprays was essential.

PINE (T. S.). **Increased production of geminate buds on Peach-mosaic-infected Peach trees.**—Abs. in *Phytopathology*, **51**, 1, p. 67, 1961.

Only 6·9% of the buds counted on healthy peach trees in early spring were geminate (2 complete flower buds on a common receptacle and enclosed by the same scales) as against 29·3% on those infected by peach mosaic virus. This increase is considered to be a host response to virus infection.

Petersen (D. H.). **Polyporus spp. associated with wood decay of living Peach trees in South Carolina.**—*Plant Dis. Reptr*, **45**, 3, pp. 186–189, 1961.

Listed are 13 *Polyporus* spp. found on decayed tissue of living peach trees in S. Carol. [cf. **40**, 370].

Glaser (T.) & Schmidle (A.). **Über Hypertrophien an Pfirsichzweigen.** [On hypertrophies of Peach branches.]—*Phytopath. Z.*, **40**, 4, pp. 373–378, 5 fig., 1961. [Engl. summ.]

Clasterosporium carpophilum [**37**, 668], *Cytospora* spp., several other fungi, and also bacteria were isolated from hypertrophies or galls found on 2–10-yr.-old peach seedlings in Poland and on 12–13-yr.-old trees in Germany. Infection tests at Inst. für Obstkrankheiten, Heidelberg, showed that *Clasterosporium carpophilum* is either the cause of these galls or a factor contributing to their formation.

Ogawa (J. M.), Butler (E. E.), & Lyda (S. D.). **Gilbertella fruit rot of Peaches in California.**—Abs. in *Phytopathology*, **51**, 1, p. 67, 1961.

G. persicaria [**40**, 316, 347] rots ripe peaches in the field and particularly during storage. The opt. temp. for germination, growth, and fruit rot is 30–33° C. Sporangiospores are transmitted by *Drosophila melanogaster* and *Carpophilus hemipterus*.

Helton (A. W.) & Konicek (D. E.). **Effects of selected Cytospora isolates from stone fruits on certain stone fruit varieties.**—*Phytopathology*, **51**, 3, pp. 152–157, 6 graphs, 1961.

At Idaho agric. Exp. Sta., Moscow, 6 isolates of *Cytospora* [**35**, 686], 4 identified from conidial characters as *C.* [*Valsa*] *cincta* and 2 as *C.* [*V.*] *leucostoma*, were wound-inoculated to plum, prune, and peach. They were not host-specific and varied from saprophytes to vigorous wound-pathogens. Cankers spread most rapidly when both nights and days were warm.

English (H.), DeVay (J. E.), Lilleland (O.), & Davis (J. R.). **Effect of certain soil treatments on the development of bacterial canker in Peach trees.**—Abs. in *Phytopathology*, **51**, 1, p. 65, 1961.

In a Calif. peach orchard infested with *Pseudomonas syringae* soil fumigation with D–D or picfume (chloropicrin) before re-planting with Red Haven peach resulted in no trees dying from bacterial canker in the 1st 3 yr., compared with 85·9% in plots with low N and 12·5% in those given NPK. Trees in the fumigated plots were significantly more vigorous (measured by trunk diam.) than those in the other plots.

Perlasca (G.). **Relationships among isolates of Pseudomonas syringae pathogenic on stone fruit trees.**—*Phytopathology*, **50**, 12, pp. 889–899, 6 fig., 1960. [34 ref.]

A wide range of variability in 2 isolates of *P. syringae* from almond, 1 from cherry and 1 from peach (all from Calif.), was studied at Univ. Calif., Davis. Cells of differing pathogenicity were present in isolates originally purified by dilution plating. The isolates could not be placed in a single serological group, and individuals with varying virulence were identical serologically.

Two antigenically identical isolates, 1 from almond and 1 from peach, were consistently lysed by the same phages. No phage specific for a particular isolate was found. The lytic reaction was more common among the isolates than the agglutination reaction.

Kolesnikov (M. A.). Черешня. [The Cherry.]—199 pp., 4 col. pl., 34 fig., Moscow, Sel'khozgiz, 1959. Roubles 3.15.

A sect. on diseases (pp. 168–179) includes tables of control measures. According to

data from the Krasnodar exp. Sta., the following vars. are most resistant to *Clasterosporium carpophilum* [**39**, 329]: Vinklera belaya, Verderskaya rannyaya, Bigarreau Grollya, Gubena krasnaya, Denissena zheltaya, Kozlovskaya Michurina, Lyutsiya zheltaya, White Napoleon, Ramon Oliva, Plotnomyasaya, Frantsuzskaya chernaya, Chernÿĭ orel, El'ton, Zolotistaya, Nadezhnaya, and Kubanskaya rozovaya.

GILMER (R. M.). **Cherry rosette : its nonidentity with Pfeffingerkrankheit and its possible affinity with Stecklinberger disease.** –*Plant Dis. Reptr*, **45**, 3, pp. 228–231, 1961. [16 ref.]

It was shown at the N.Y. State agric. Exp. Sta., Geneva, that cherry rosette [**37**, 589] is induced by Fulton's virus E [**38**, 194], an anomalous str. of [peach] necrotic ring spot virus [**40**, 177]. The symptoms of rosette are similar to those of Pfeffinger disease [cherry rasp leaf: cf. **39**, 601] but the viruses differ in host range and physical properties. Rosette shows more affinities with Stecklenberg disease [peach ring spot virus str.: loc. cit.] and it seems likely that these are both caused by the same virus, or by very similar ones.

LOTT (T. B.) & KEANE (F. W. L.). **The host range of the virus of Lambert mottle of Cherry, a progress report.**—*Plant Dis. Reptr*, **45**, 3, pp. 204–207, 1961.

At the Canada Dept Agric., Summerland, B.C., 14 sweet cherry vars. became infected following inoculation with Lambert mottle virus [cherry necrotic rusty mottle virus str.: **40**, 117] and 11 vars. developed typical symptoms. Infection without symptoms was demonstrated in sour cherry, peach, and *Prunus mahaleb*. Chokecherry, apricot, plum, wild cherry (*P. emarginata* var. *mollis*), 4 apple vars., and 1 pear were not susceptible.

POSNETTE (A. F.) & CROPLEY (R.). **European rusty mottle disease of Sweet Cherry.** —*Rep. E. Malling Res. Sta., 1960*, pp. 85–86, 2 fig., 1961.

Rust-coloured pigmentation of the leaves in late summer is characteristic of the virus disease prevalent in sweet cherry trees in England, now known as European rusty mottle [**39**, 601]. It is distinct from the American mild rusty mottle of sweet cherry [**26**, 248], which causes shedding of yellow leaves with ring patterns in early summer, and is apparently not related to [peach] necrotic ring spot or to other *Prunus* viruses.

NYLAND (G.). **Mechanical transmission of two strains of Sweet Cherry rugose mosaic, mild rusty mottle and rasp leaf viruses.**—Abs. in *Phytopathology*, **51**, 1, pp. 66–67, 1961.

Two strs. of cherry rugose mosaic were sap transmitted from *Prunus avium* and *P. mahaleb*, and 1 from peach, to *Chenopodium amaranticolor* (local and systemic symptoms), petunia, *Gomphrena*, and zinnia. Mild rusty mottle and cherry rasp leaf viruses [**40**, 113] produced systemic symptoms on *C. amaranticolor* only.

CROSSE (J. E.) & SHANMUGANATHAN (N.). **Pathogenicity tests with isolates of Pseudomonas mors-prunorum from leaf surfaces of sprayed and unsprayed Cherry trees.**—*Rep. E. Malling Res. Sta., 1960*, pp. 87–89, 1961.

Most of the *P. mors-prunorum* isolates from the surfaces of unsprayed cherry trees [cf. **38**, 757] and from those sprayed with streptomycin or Bordeaux mixture were pathogenic when inoculated to branches in the winter, but their virulence differed and showed no clear correlation with previous spray treatment. Napoleon trees from the same nursery propagated from the same clonal source on the same rootstock showed different degrees of resistance when inoculated in the orchard.

1961 pest and disease control program for Almonds.—*Leafl. Calif. agric. Exp. Sta.* 69, 2 pp. (folder), 1961.

Included in this schedule are details of the min. spray programme required for the control of brown rot [*Sclerotinia laxa*: **30**, 49], shot hole [*Clasterosporium carpophilum*: **38**, 522], leaf blight [*Hendersonia rubi*: **38**, 492], and scab [*Fusicladium carpophilum*: **35**, 200].

Mirocha (C. J.), Wilson (E. E.), & DeVay (J. E.). **The hull rot disease of Almond and the pathway for translocation of a toxin involved in symptom development.** —Abs. in *Phytopathology*, **51**, 1, p. 66, 1961.

Since the pathogens associated with hull rot and twig blight of almond, mainly *Rhizopus stolonifer*, *R. circinans*, and *R. arrhizus* [**40**, 178], were present in the hull mesocarp but not in the blighted twigs it was postulated that the blight symptoms were caused by a translocated toxin, the pathway for which was demonstrated by applying P^{32} to the mesocarp when the hulls began to dehisce. From healthy and infected fruits the P^{32} became distributed in the leaves in a pattern similar to the symptoms.

Talboys (P. W.), Bennett (Margery), & Wilson (J. F.). **Tolerance to Verticillium wilt diseases in the Strawberry.**—*Rep. E. Malling Res. Sta., 1960*, pp. 94–99, 4 graphs, 1961. [15 ref.]

An account of experiments confirming that under some environmental conditions the strawberry can tolerate *V. dahliae* [**39**, 652; **40**, 90] within the vascular system without developing symptoms. Royal Sovereign, Cambridge Premier, and Huxley were all moderately tolerant, while Talisman was relatively highly so. Field observations suggest that the disease tends to be more severe when the early summer is dry and warm than when it is wet and cool; wilt also tends to be more severe on light, well-drained soils. *V. alboatrum*, though less prevalent, was much more pathogenic than *V. dahliae*, and environmental differences had much less effect on the severity of the disease. Only Talisman was highly tolerant, both spp. induced severe disease in Cambridge Vigour. It is suggested that the use of tolerant vars. in the control of these diseases should be combined with periodic measures to reduce soil infectivity either by use of crop rotations excluding such *V.* hosts as potatoes and raspberries and preferably including highly resistant or immune grasses or cereals, or of partial sterilization of the soil with a volatile fungicide.

Buddenhagen (I. W.). **Bacterial wilt of Bananas : history and known distribution.** —*Trop. Agriculture, Trin.*, **38**, 2, pp. 107–121, 8 fig. (3 col.), 2 maps, 1961. [73 ref.]

This beautifully illustrated account of the wilt disease of bananas, plantains, and *Heliconia* spp. [cf. **40**, 235] caused by *Pseudomonas solanacearum* contains a description of disease symptoms and assesses critically previous reports of the disease from all parts of the world. At the Vining C. Dunlap Labs., Tela Railroad Co., La Lima, Honduras, symptoms used for positive disease identification are fruit rot and fruit stalk discoloration and wilting or blackened regrowth suckers. An additional syndrome, termed 'distortion', is described in which the plants remain alive but are stunted; new leaves produced are narrow and may be twisted; the leaf sheaths separate and become twisted, deformed, and later blackened. Internal vascular discoloration is the same as with the normal or rapid wilt syndrome.

The known range of bacterial wilt of bananas is more limited than reports in the literature would indicate. The disease is known today to be present in Panama, Honduras, Trinidad, Venezuela, British Guiana, and Costa Rica; in the last 4 territories it is one of the main limiting factors in banana and plantain production. Unlike Panama disease (*Fusarium oxysporum* f. *cubense*) which affects Gros Michel and few

other edible *Musa* spp. in the W. Hemisphere, bacterial wilt may affect any of the commonly grown bananas or plantains, and the symptoms are the same in each.

The presence of the disease in Honduras and on the Caribbean coast of Panama is believed to have followed introduction of planting material from Venezuela, Costa Rica, or elsewhere in Panama. Diseased indigenous *Heliconia* spp. have apparently been involved in the subsequent appearance of wilt in Costa Rica. The limited distribution of the disease contrasts with the world-wide distribution of bacterial wilt of the solanaceous strs. of *P. solanacearum* [map 138].

MEREDITH (D. S.). **Fruit-spot ('speckle') of Jamaican Bananas caused by Deightoniella torulosa (Syd.) Ellis. 1. Symptoms of disease and studies on pathogenicity.** —*Trans. Brit. mycol. Soc.*, **44**, 1, pp. 95–104, 2 pl. (7 fig.), 1961. [21 ref.]

Some of this information from the Banana Board Res. Dept, Kingston, Jamaica, has been noticed [**39**, 433; **40**, 318]. In pathogenicity tests with *D. torulosa* spots developed on the peel in 48 hr. and were 3 mm. in diam. after 72 hr. Conidia germinate within 1 hr. and produce 1 or 2 appressoria which develop infection hyphae that penetrate mechanically in 12–20 hr. Cell walls and contents developed a reddish brown colour and sometimes contained large numbers of spherical inclusion bodies.

ABE (T.) & YEH (C.-T.). **Fruit rot of Fig caused by Macrophoma sp.**—*Sci. Rep. Kyoto Univ. Agric.* 12, pp. 57–63, 1 pl. (3 fig.), 1 fig., 1960. [Jap. Abs. from Engl. summ.]

A previously undescribed fruit rot of figs was observed in a field at Kyoto Univ. in Oct. 1958. A *Macrophoma* sp. [cf. **39**, 74] isolated from diseased tissue reproduced symptoms on wounded figs. In culture the fungus grew best at 28° C. and pH 4·2–4·8; the thermal death point was 20 min. at 45° C. The pathogen was also able to infect wounded fig twigs, sweet orange and apple fruits, and green leaves of tea, but no infection was obtained without wounding.

GORTER (G. J. M. A.). **The toxicity of some fungicides to conidia of Gloeosporium fructigenum f. chromogenum.**—*Tijdschr. PlZiekt.*, **67**, 1, pp. 21–24, 1961. [Dutch summ. 14 ref.]

Control of this fungus, which causes anthracnose of olives in S. Africa, by Bordeaux mixture recommended by Dept Agric., Pretoria, is now being achieved by factory-made fixed Cu sprays and organic fungicides. Evaluation of a number of these substances by spore germination tests, the results of which are presented, showed cuprous oxide to be slightly better than Bordeaux mixture, captan and dichlone considerably better, Cu oxychloride and zineb less effective, and ferbam the most effective of all.

LEGG (J. T.) & ORMEROD (P. J.). **Yellow net—a virus disease of Hop.**—*Rep. E. Malling Res. Sta., 1960*, p. 105, 1 fig., 1961.

The name hop yellow net is proposed for the virus, found on a few plants of Fuggle and Bullion hops, causing interveinal chlorosis of hop leaves [cf. **39**, 728]. It was transmitted by grafting to Fuggle but not by sap inoculation to herbaceous plants. The yellow banding of tertiary veins of young leaves extends as the leaf matures, though primary and secondary veins remain green and there is no leaf distortion.

LEGG (J. T.). **The influence of a latent virus on the development of nettlehead disease in Hop.**—*Rep. E. Malling Res. Sta., 1960*, pp. 106–107, 2 fig., 1961.

Fuggle and Bramling hops became more sensitive to hop nettlehead virus [**39**, 652] after being grafted with scions of Early Prolific. The extreme sensitivity of the latter appears to be due to a latent virus (termed hop latent virus X) which shortens

the incubation period of nettlehead virus to about 6 weeks, compared with 5–12 months if it is absent; it may also increase the severity of symptoms.

SEWELL (G. W. F.) & WILSON (J. F.). **Machine picking in relation to progressive Verticillium wilt of the Hop. I. A study of the infectivity of machine-picked Hop waste.**—*Rep. E. Malling Res. Sta., 1960*, pp. 100–104, 1 graph, 1961.

Infection by the virulent, or progressive, *V. alboatrum* str. [**39**, 651] can occur without symptoms in both wilt-sensitive and wilt-tolerant hop vars. The harvesting of such symptomless infected plants for machine-picking involves its transport and accumulation in large quantities. The high infectivity of this waste was demonstrated by placing 4 oz. lots beneath newly planted setts of Fuggle N on land hitherto free from *V.* infection. Burning is recommended as the only safe method of disposing of infected hop waste. Failing this, potentially infective material should be fully and effectively composted and the compost applied to land other than hop. Precautions against wind or other dispersal of hop debris are also desirable.

BERRY (S. Z.) & THOMAS (C. A.). **Influence of soil temperature, isolates, and method of inoculation on resistance of Mint to Verticillium wilt.**—*Phytopathology*, **61**, 3, pp. 169–174, 3 fig., 9 graphs, 1961.

Part of this work on *V. alboatrum* (at Beltsville, Md) has been noticed [**40**, 60]. Most diseased clones recovered at 25° C., and more rapidly at 30°; at 10° the disease progressed very slowly. The range of resistance was similar, but disease intensity less, in unrooted cuttings after immersion of the cut ends in an inoculum suspension for 48 hr. Isolates that were mildly pathogenic in root inoculations were more virulent in wounded stems. Six levels of resistance were distinguished by varying the soil temp. and the site of inoculation.

ASHRI (A.). **The susceptibility of Safflower varieties and species to several foliage diseases in Israel. Seed-borne Cercospora on Safflower.**—*Plant Dis. Reptr*, **45**, 2, pp. 146–150, 7 fig.; p. 153, 1961.

During 1960 at the Fac. Agric., Hebrew Univ., Rehovot, Israel, the reactions of 39 safflower vars. and 6 wild *Carthamus* spp. to *Puccinia carthami* [**38**, 325], *Ramularia carthamicola*, *Cercospora carthami*, *Alternaria carthami*, and *Stemphylium* sp. were determined. The results are tabulated and brief descriptions given of the symptoms of these diseases. The races of *P. carthami* in Israel do not correspond to those in the U.S.A. [**38**, 94].

C. carthami is newly recorded for Israel and is apparently seed-borne.

McCAIN (A. H.) & OGAWA (J. M.). **The control of seed-borne Safflower rust by steam.** —Abs. in *Phytopathology*, **51**, 1, p. 66, 1961.

Safflower seeds heavily infested with *Puccinia carthami* [**39**, 332] were exposed to steam for 1 sec. by being dropped 4 times through a 1 ft. coil of perforated Cu tubing under steam pressure. None of the 3,200 plants from treated seed was infected, compared with 17·4% of the untreated.

KHAN (S. A.). **A leaf spot of Safflower.**—*Pakist. J. sci. Res.*, **12**, 3, p. 130, 2 fig., 1960.

Ramularia carthami [cf. **38**, 270] was the agent of this leaf spot in an experimental planting at the Agric. Res. Sta., Tandojan, in 1957–8, a 1st record for Pakistan. The conidiophores measured $15–58 \times 3–5\,\mu$ and the conidia $15–35 \times 4–8\,\mu$.

Abstracts of Philippine publications on the Cadang-cadang disease of the Coconut palm (Cocos nucifera L.)—*Philipp. Ser. Abstr.* 1, iii+69 pp., 1960.

The disease [cf. **39**, 608] was 1st observed in 1914. The 244 articles abstracted,

from the local press and other publications, begin with one paper of 1937, the remaining contributions, in chronological order, dating from 1947–60.

BOOTH (C.) & ROBERTSON (J. S.). **Leptosphaeria elaeidis sp. nov. isolated from anthracnosed tissue of Oil Palm seedlings.**—*Trans. Brit. mycol. Soc.*, **44**, 1, pp. 24–26, 1 fig., 1961.

A description is given of *L. elaeidis* Booth & Robertson obtained from anthracnosed leaves of young oil palm seedlings in Nigeria following a *Pestalotiopsis* conidial state [**39**, 486]. The same sp. was subsequently isolated from sugarcane in Jamaica. The connexion between the 2 states was established by cultural work.

UBILLOS MÚJICA (M.). **Pequeña historia de cinco variedades españolas.** [Brief history of five Spanish varieties.]—*An. Inst. nac. Invest. agron.*, **9**, 2, pp. 335–357, 6 col. pl., 1960. [Engl. summ.]

The characters and parentage of 5 new potato vars. in the Spanish register are described and tabulated, together with their resistance or susceptibility to blight [*Phytophthora infestans*], *Alternaria* [*solani*] blight, wart disease [*Synchytrium endobioticum*], potato A, leaf roll, X, and Y viruses, and to rust spot. Turia is resistant to virus X and rust spot; Victor is very resistant to the blights and rust spot, less so to virus Y; Goya is resistant to blight, almost so to *Alternaria* blight, rust spot, and virus X, and apparently to frost injury; Olalla is resistant to wart, viruses A and X, and less so to virus Y and leaf roll; Duquesa has some resistance to tuber blight, is resistant to virus X, and slightly less so to rust spot.

BUESA Y BUESA (J.). **Cómputos de la propagación por familias.** [Computations of propagation by families.]—*An. Inst. nac. Invest. agron.*, **9**, 2, pp. 421–440. [Engl. summ.]

The Potato Improvement Sta. near Madrid is concerned with the production of élite seed. Work during 1953–58 in producing virus-resistant vars. [see above] by selection and cross-breeding is described and the data analysed. Factors and methods of genealogical selection are discussed, also results obtained in 5 test plots, and the value and utility of 10 potato vars. It is stressed that the aim was less to produce disease-free vars. than some virus-tolerant ones.

GARCÍA ORAD (A.) & PÉREZ DE SAN ROMÁN (F.). **Las pruebas de invierno en el análisis virológico por familias.** [Glasshouse tests on virus analysis by families.]—*An. Inst. nac. Invest. agron.*, **9**, 2, pp. 215–248, 11 pl., 1960. [Engl. summ. 19 ref.]

The quality of seed potatoes was greatly improved at Madrid, Spain, by selection from originally healthy plants in infected fields. Selection in the glasshouse is, however, necessary to eliminate tubers infected by potato viruses A and X which are difficult to detect in the field, and to reduce infections of Y or leaf roll viruses [**38**, 418]. This method is described, also techniques for speeding up and intensifying symptom expression to facilitate detection of infected plants, as well as auxiliary serological and histological tests and inoculations on other *Solanum* spp. Errors in diagnosis and sampling are discussed as they affect the accuracy of these methods, also the general value of glasshouse tests.

SPRAU (F.). **Über die Möglichkeit einer Beschleunigung und Vereinfachung der Augenstecklingsprüfung.** [On the possibility of an acceleration and simplication of the testing of eye cuttings.]—*Pflanzenschutz*, **12**, 11–12, pp. 154–156, 2 fig., 1960.

In further studies on the hydroponic test for potato viruses [cf. **31**, 571] at the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, the addi-

tion of Cl to the nutrient solution, particularly when N was deficient, stimulated rapid development of symptoms, especially those of potato leaf roll.

Butkiewicz (Hanna). **Wyniki wstępnych prac nad wykrywaniem liściozwoju za pomocą metody rezorcynowej.** [Results of preliminary studies on the observation of leaf roll with the help of the resorcin method.] —*Biul. Inst. hodowli i aklimat. Roślin, 1959*, 6, pp. 33–46, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 7, Sect. G, p. 78, 1961.]

Potato vars. Pervesnek, Bintje, and Bém were inoculated (by aphids) with leaf roll virus [cf. **39**, 729] at the start of flower bud formation, and again during flowering: 20 days later the tubers were lifted. In sections stained with 10 g. resorcin in 1 l. distilled water – 12 ml. 25% ammonia (left in an open vessel until 'matured') the callus appeared as blue spots and streaks.

Łuniewski (H.). **Barwieniowa metoda jodowa do wykrywania wirusa liściozwoju.** [A method for observing leaf roll virus by staining with iodine.]—*Biul. Inst. hodowli i aklimat. Roślin, 1959*, 6, pp. 49–50, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 7, Sect. B, p. 5, 1961.]

[Potato] leaves suspected of leaf roll virus infection were immersed in boiling water, then irrigated with denatured alcohol in a Petri dish and stained with a solution of I in KI. Dark lesions appeared on the leaves of infected plants after ½ hr. It is difficult to assess the accuracy of the method, but it is economical.

Trojanowski (H.). **Metody wykrywania wirusa liściozwoju (Solanum virus 14) w kłębach Ziemniaczanych w Szwajcarii.** [Methods for detecting Potato leaf roll virus in Potato tubers in Switzerland.] -*Biul. Inst. Ochr. Roś., Poznań, 1960*, 9, pp. 25–38, 1960. [Russ., Engl. summ. Cyclostyled.]

The methods used at the Reckenholz Sta. of the Swiss Res. Inst. included application of rindite to obtain early germination [cf. **40**, 377] and accelerate diagnosis of symptoms, and the Igel-Lange method with application of resorcin blue for better contrast [cf. **36**, 5 and loc. cit.], though this was not completely reliable.

Kassanis (B.). **Potato paracrinkle virus.**—*Europ. Potato J.*, **4**, 1, pp. 14–25, 5 fig., 1961. [Germ., Fr., summ. 15 ref.]

In further studies at Rothamsted exp. Sta. it was found that potato paracrinkle virus and potato virus S [cf. **39**, 239; **40**, 379] share only a few antigenic groups and do not protect plants against each other. All plants from commercial stocks of King Edward tested were infected, some by paracrinkle alone, some by both viruses, and 1 by S only. The precipitation titres of the 2 antisera were much greater in experiments with the homologous than with the heterologous viruses.

Infected King Edward plants are not symptomless; in comparison with plants of a virus-free clone, derived from an apical meristem, they are less vigorous and their leaves are pale and ruffled. The use of virus-free Arran Victory plants from apical meristems showed that severe symptoms of paracrinkle (blotchy mottle and crinkling) can be caused by paracrinkle virus in the absence of virus S. Most paracrinkle strs. from commercial stocks of King Edward were of the severe type, but a few produced only slight symptoms on Arran Victory. Some weak strs. caused blotchy mottle, others a slight leaf rolling resembling that described by Schultz & Rolsom [**3**, 548]. Some were transmitted by *Myzus persicae*, others not, but those so transmitted were found in all of 7 commercial stocks of King Edward examined.

The term 'sero-type' ('serological type') is proposed for viruses sharing only a few of their antigens, in contrast to 'strain' for those with most of their antigens in common. The name 'leaf-rolling mosaic' is proposed for a group of serologically

related viruses consisting of (1) sero-type potato virus S [cf. de Bruyn Ouboter, **32**, 144]; (2) sero-type potato paracrinkle virus [**9**, 604]; and (3) sero-type carnation latent virus [**36**, 419].

KASSANIS (B.). **The transmission of Potato aucuba mosaic virus by aphids from plants also infected by Potato viruses A or Y.**—*Virology*, **13**, 1, pp. 93–97, 1 fig., 1961.

None of 12 strs. of potato aucuba mosaic was transmitted by *Myzus persicae* from potato plants infected by this virus alone in tests at Rothamsted, but transmission was secured from plants previously infected by potato virus A or Y; some strs. were more readily transmitted than others. The conc. of aucuba mosaic was increased in the presence of the other viruses.

NURMISTE (B.). Предварительные данные об антигенных свойствах вируса К. [Preliminary data on the antigenic properties of Potato leaf rolling mosaic virus.]—*Eesti NSV teadus. Akad. Toimet.*, Ser. biol., **9**, 2, pp. 127–130, 1960. [Russ., Eston., Germ. summ.]

In the 1st stages of selection potato seedlings at the Ĭy̆geva Select. Sta., Estonia, were found to be considerably infected by the virus [cf. **36**, 781], and it occurred in individual vars. in all regions of the Republic. At the Inst. exp. Biol., Estonian Acad. Sci., the virus was identified with the help of *Solanum demissum* and *S. acaule*, the other usual indicators being immune. Thermal inactivation was at 70–73° C. for 10 min. Results were confirmed serologically. For the preparation of the antigen plants of the Ĭy̆geva Piklik var. were used, in which the virus was mixed with [potato] virus S. Both viruses were transmitted to *S. demissum* by inoculation, typical symptoms of the former developing. The sap used for further inoculation was heated to 70° to inactivate virus S. Rabbit serum had typical antiserum properties in relation to sap from *S. demissum* artificially infected by leaf rolling mosaic, and to the sap of inoculated plants of Ĭy̆egva Piklik. Initial results show that the virus is specific in its antigenic properties, and clearly different from viruses X and S. The antiserum can be used for selecting healthy seed material in susceptible vars.

JANKE (CHRISTEL) & RAMSON (A.). **Ein Beitrag zur Gelbfleckigkeit des Kartoffellaubes.** [A contribution to yellow spotting of Potato foliage.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **14**, 10, pp. 201–203, 2 fig., 1960. [Russ., Engl. summ.]

In 1959 the Biol. Zentralanstalt, Berlin, collected 44 leaf samples from potato plants with yellow spot. Viruses were transmitted from 33 of these to broad bean and *Capsicum annuum*, 32 yielding lucerne mosaic virus [**38**, 273] and 1 [potato] aucuba mosaic virus.

MÉLARD (V.). **L'amélioration de la résistance au Phytophthora de la Pomme de terre en Belgique.** [Improvement in the resistance to *Phytophthora* of the Potato in Belgium.]—*Europ. Potato J.*, **4**, 1, pp. 40–51, 4 graphs, 1961. [Engl., Germ. summ.]

Studies at the Sta. de Recherches de l'État pour l'Amélioration de la Culture de la Pomme de Terre, Libramont, Belgium, aimed at finding vars. with both foliage and tuber resistance. The appearance of more virulent strs. of *P. infestans* following the development of resistant hybrids led to greater use of field (or long-incubation) resistance. Some types of *Solanum andigenum* received from W. Germany had a 'double' resistance to all strs., effective against initial attack, spread in the host, and sporulation. This type of resistance was also found in some clones of *S. demissum* and *S. stoloniferum* and to a less extent in some commercial vars.

Inoculation of tubers of 206 var. which had shown different degrees of field resistance indicated that there is generally a correlation between foliage resistance and that of the tubers; in all vars. tested the mature tuber proved more resistant than the immature.

LAPWOOD (D. H.) & MCKEE (R. K.). **Reaction of tubers of R-gene Potato clones to inoculation with specialized races of Phytophthora infestans.**—*Europ. Potato J.*, **4**, 1, pp. 3–13, 4 graphs, 1961. [Germ., Fr. summ.]

At Rothamsted exp. Sta. and John Innes Inst., Bayfordbury, Herts., tubers of 46 R-gene clones [cf. **33**, 47] were inoculated with races of *P. infestans* causing a hypersensitive reaction of the leaves [cf. **36**, 269] or able to infect and spread in the haulm.

Gene R_1 conferred comparable hypersensitivity upon tubers and leaves, whereas R_2, R_3, and R_4 frequently failed to do so. Races to which leaves of R_2, R_3, and R_4 clones were hypersensitive grew in the tubers, though more slowly than in clones lacking these genes. The importance of the hypersensitivity reaction varied widely in clones with the same R gene, indicating that secondary factors influenced the effect of the principal gene.

Tubers of most clones were very susceptible (often more so than King Edward) to races spreading in the leaves, Orion and Reaal being among the few clones exceptional in this respect.

On the whole, there was little difference between the susceptibility of the cortex and that of the medulla. The cortex, however, was often more susceptible than the medulla in clones with a poor mycelial development in spite of a hypersensitive reaction. Orion should prove a useful var., in view of its resistance, in countries where potatoes with yellow flesh are favoured.

ULLRICH (J.). **Kritische Bemerkungen zur Herkunft SB ('Rasse 3') des Kartoffelkrebserregers (Synchytrium endobioticum).** [Critical remarks on the source SB ('Race 3') of the Potato wart pathogen (*S. endobioticum*).]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **13**, 1, pp. 10–11, 1960.

The biotype SB was found in Czechoslovakia in 1942 and later known as race 3 [**32**, 273]. The Biologische Bundesanstalt, Brunswick, now reports that the vars. which helped to distinguish this from race 1 no longer exist, or are unsuitable for race differentiation, and suggests that race 3 should be withdrawn.

DINGLER (O.), HOFFMANN (G. M.), REHFELDT (K.), & SCHMIEDEKNECHT (M.). **Bekämpfung von Streptomyces scabies Waksman et Henrici, Rhizoctonia solani Kühn und Colletotrichum atramentarium (Berk. et Br.) Taub. bei Kartoffeln durch Bodenentseuchung mit Pentachlornitrobenzol.** [Control of *S. scabies*, *Corticium solani* and *Colletotrichum atramentarium* on Potatoes by soil disinfection with pentachloronitrobenzene.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **14**, 12, pp. 241–246, 1960. [Russ., Engl. summ.]

In the districts of Grimmen and Gransee, E. Germany, 1956–57, quintozene at 2 and 5 kg./are reduced infection by these pathogens to ca. 50–60% of that in untreated soil [cf. **39**, 616]. Treatment did not affect total yield but doubled the proportion of marketable tubers. In screening tests trichlorodinitrobenzene was equally or slightly less effective, as was tecnazene, but this also inhibited growth of the host plant. The latter is often used as a sprouting inhibitor, and its simultaneous fungicidal effect makes it all the more valuable.

AMANN (M.). **Untersuchungen über einen sklerotienbildenden Pilz an Kartoffeln, vermutlich Sclerotium bataticola (Taub.) synonym Macrophomina phaseoli (Maubl.) Ashby.** [Investigations on a sclerotia forming fungus on Potatoes,

presumably *M. phaseoli.*]—*Z. PflKrankh.*, **67**, 11–12, pp. 655–662, 5 fig., 2 graphs, 1960. [Engl. summ.]

From subterranean parts and the tubers of potatoes on the dry slopes of the Taubergrund district of Germany *Colletotrichum atramentarium*, *Spondylocladium* [*Helminthosporium*] *atrovirens*, and *M. phaseoli* in the imperfect state were isolated. The last showed no significant pathogenicity to potatoes and beans. In inoculation tests on potatoes it caused no decrease in yield, but together with *C. atramentarium* produced a clear depression. Infected tubers developed typical charcoal rot [cf. **35**, 788].

Khar'kova (Mme A. P.). К вопросу о биологии возбудителя оospороза **Oospora pustulans Owen et Wakef.** [On the biology of the causal agent of oosporosis, *O. pustulans.*]—*Bot. Zh. S.S.S.R.*, **46**, 3, pp. 399–407, 11 fig., 1961.

Further studies by the Arctic exp. Sta. All-Union Inst. for Plant Growing, Khibiny̆, Murmansk area, U.S.S.R. [cf. **39**, 492], revealed that (1) under unfavourable conditions conidiophores are not formed, the hyphae simply breaking up into oidia; (2) the fungus enters potato tubers through lenticels, eyes, mechanical wounds and lesions of common and powdery scab [*Streptomyces scabies* and *Spongospora subterranea*], and stolons of seed tubers; (3) infection takes place during tuber formation and at harvest by contact with underground parts covered by the fungus, and secondary infection occurs in storage; (4) the fungus overwinters on plant debris in the conidial state, but can also survive in the soil as sclerotia; and (5) the manure of animals fed on infected potatoes acts as a source of inoculum. Control should consist in the use of healthy or at least only slightly infected seed tubers, crop rotation, the destruction of debris after harvest, steam disinfection of potatoes used for fodder, and the maintenance of low humidity and fresh air in storage.

Mygind (H.). **Kartoffelskurven, dens årsager og bekæmpelsesmuligheder.** [Potato scab, its causes and possibilities of control.]—Reprinted from *Ugeskr. Landm.*, *1961*, 12, 5 pp., 1 fig., 1961. [32 ref.]

Useful information is presented on *Streptomyces scabies* under the headings of factors governing infection, physiological relations between pathogen and host, physiologic races and their differing virulence, and possibilities of control by (*a*) alteration in the living conditions of the fungus in the soil, and (*b*) soil treatment with brassicol super conc.

The examination at the Phytopath. Exp. Sta., Lyngby, of isolates from tubers collected in some 50 localities of Denmark yielded clear evidence of physiologic specialization [cf. **38**, 766].

Of many minerals tested as soil amendments only $AlSO_4$ was fairly effective, but it can hardly be recommended in practice. The favourable influence sometimes exerted by $MnSO_4$ appears to be erratic and large quantities are necessary to produce it. On the other hand, in 19 experiments during 1956–59, 60% brassicol super conc. reduced infection by *S. scabies* to barely $\frac{1}{2}$, while less than $\frac{1}{2}$ the tubers from the treated plots bore sclerotia of stem canker [*Corticium solani*].

Potter (H. S.), Warren (H. L.), & Hooker (W. J.). **Soil fungicides for scab control.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **43**, 3, pp. 532–538, 3 fig., 1961. [10 ref.]

In a preliminary trial in Montcalm County, the experimental compound DAC-649 (3, 3, 4, 4-tetrachlorotetrahydrolthiophene-1-1-dioxide) applied at 60 lb./acre mixed 1 : 4 with soil and spread in an 18 in. band with a fertilizer spreader and mixed with a rotovator, was as good or better than PCNB or urea-formaldehyde (UF. 85) against *Streptomyces scabies* on potato [**39**, 36]. The development of a suitable applicator for soil fungicides is in progress.

GIEBEL (J.). **Wpływ metabolitów Penicillium brevi-compactum i Penicillium terrestre na wylęg larw z cyst mątwika ziemniaczanego (Heterodera rostochiensis Woll.).** [Influence of the metabolites *P. brevicompactum* and *P. terrestre* on the hatch of larvae from the cysts of the Potato root eelworm *H. rostochiensis*.] —*Biul. Inst. Ochr. Roś., Poznań, 1960*, 9, pp. 215–229, 1960. [Russ., Engl. summ. Cyclostyled.]

Counts of *H. rostochiensis* [cf. **36**, 344] eggs hatched both in soil infested by *P. brevicompactum* and in sterile quartz sand containing *P. brevicompactum* and *P. terrestre* culture filtrates indicated a stimulating effect of these spp.

KANTACK (E. J.), MARTIN (W. J.), & NEWSOM (L. D.). **Incidence of field spread of internal cork of Sweet Potato in insecticide-treated plots.**—*J. econ. Ent.*, **54**, 1, pp. 125–127, 1961.

At La State Univ., Baton Rouge, field plots of sweet potato var. Porto Rico, originally free from internal cork virus, were treated with insecticides during 1955–59 to reduce the spread of the virus by elimination of the principal vector, *Aphis gossypii* [**39**, 733]. Reductions of up to 50% in the incidence of infection were obtained.

Fighting Rubber disease from the air.—*Plant Chron., Upasi Conf. Suppl. 1960*, pp. 26–28, 1 fig., 1960.

Experiments on aerial spraying of rubber trees against *Phytophthora palmivora* [cf. **34**, 748] are reported. It is estimated that 1 helicopter could cover 100–130 acres/hr. or 600–700 acres/day, but assessment of final results will only be available later.

NETTE (I. T.), POMORTSEVA (Mme N. V.), & KOZLOVA (Mme E. I.). Разрушение каучука микроорганизмами. [Destruction of Rubber by micro-organisms.]—*Microbiology, Moscow*, **28**, 6, pp. 881–886, 1 pl., 1959. [Engl. summ.]

Pieces of natural rubber and of manufactured rubber products were placed in moistened soils of different origins in Petri dishes at the Biol. Soils Dept, Moscow State Univ. They quickly developed variegated spots of fungi [cf. **33**, 379] and actinomycetes. Deterioration in soil was most pronounced at 30–40° [C.]. *Aspergillus* spp. developed most frequently on moistened rubber exposed directly to the air in the lab. Of various micro-organisms isolated, *Actinomyces* Nos. 1 and 14 are active and *Proactinomyces ruber* less so in destroying rubber while *Aspergillus niger*, *A. fumigatus*, *Penicillium cyclopium*, and *Trichoderma* sp. did not decompose rubber hydrocarbons, but are thought to develop at the expense of organic admixtures.

TODD (E. H.). **Long term storage of the Sugarcane mosaic virus.**—*Plant Dis. Reptr*, **45**, 3, pp. 178–179, 1961.

At the U.S. Dept Agric., Canal Point, Fla, sugarcane mosaic virus [cf. **39**, 38] preparations in 0·01 M sodium thiosulphate and sodium sulphite were stored at −35° C. for 1 yr. without any loss of infectivity. When the results of mechanical inoculations with the virus were evaluated it was apparent that the higher temps. and photo-periods during July and Aug. were responsible for lower infection rates at that period and these factors must be considered when assessing varietal resistance.

VIJAYALAKSHMI (U.). **Record of Helicostylum pyriforme, Bainier on Sugarcane in India.**—*Curr. Sci.*, **30**, 3, pp. 107–108, 2 fig., 1961.

The fungus, recorded for the 1st time in India and on sugarcane, is described.

Chuang (W.-F.). Культура Чая. [Tea growing.]—352 pp., numerous illus., Moscow, Izdat. inostran. Lit., 1959. [Trsl. from Chinese.] Roubles 8.

Chapt. 14 of this monograph has a sect. on 'Diseases of tea plants' (pp. 322–330), including *Rosellinia necatrix* [map 306] in all tea growing areas of China, *Exobasidium vexans* [45] especially in the S.W., and *Cercospora theae* [247].

Agnihothrudu (V.). **Notes on fungi from North-east India. VII Tunstallia gen. nov. causing the 'thorny stem blight' of Tea (Camellia sinensis [L.] O. Kuntze).** —*Phytopath. Z.*, **40**, 3, pp. 277–282, 5 fig., 1961. [Germ. summ.]

A new genus is proposed to accommodate the fungus causing thorny stem blight of tea [**37**, 678]. Two distinct forms could be recognized among specimens examined at the Toklai Exp. Sta., Assam. Though not found together on the same bush they may occur in the same area. One produces consistently 4-spored asci with cymbiform spores, av. length 81–111 μ, and is conveniently placed under *T. aculeata* (Petch) Agnihothrudu. The other has 8-spored asci with narrower, anguilliform spores, 116–152 μ, and is described as a new var., *T. a.* var. *kesabii.*

Wu (J.-H.) & Rapport (I.). **An analysis of a new phenomenon of TMV abortive infections.**—Abs. in *Phytopathology*, **51**, 1, p. 68, 1961.

Although tobacco mosaic virus (TMV) str. U2 produces no apparent infection in Pinto bean [*Phaseolus vulgaris*] while str. U1 causes local lesions, the number of U1 lesions in mixed infections is reduced, suggesting competition for infection sites. Further experiments indicated that sites occupied by a U1 and 1 or more U2 particles do not develop any demonstrable infection, since UV irradiation enabled some of them to produce lesions, in the proportion to be expected if the U2 particles were inactivated, leaving the U1 uninjured [cf. **40**, 246].

Lindner (R. C.), Cheo (P. C.), Kirkpatrick (H. C.), & Govindu (H. C.). **Some effects of 8-azaguanine on Tobacco mosaic virus replication.**—*Phytopathology*, **50**, 12, pp. 884–889, 9 graphs, 1960.

At Wash. agric. Exp. Sta., Pullman, replication sites of tobacco mosaic virus in *Physalis floridana* and systemic virus spread were inhibited by brushing the leaves with 8-azaguanine [cf. **37**, 679]. Modified virus obtained from treated plants sedimented more slowly under centrifugation than normal TMV; 8-azaguanine acted on the host rather than the virus; replication sites in tobacco were not inhibited. Lesion numbers in cucumber and *Nicotiana glutinosa* were reduced. The infectivity of RNA in virus from treated *P. floridana* plants was only $\frac{1}{5}$ of that from normal TMV.

It is postulated that 8-azaguanine is incorporated in the host at the virus replication sites; thus virus containing varying amounts is produced, that with a low content having reduced infectivity and that with a high content being non-infective, while a very high concentration completely blocks virus replication. Some other mechanism may operate in the effect of 8-azaguanine on systemic virus spread.

Moycho (W.), Gubański (M.), & Kędziora (T.). **Tobacco mosaic virus (TMV) inhibitors in lichens.**—*Bull. Acad. polon. Sci.*, Sér. Sci. biol., **8**, 5, pp. 209–212, 1 fig., 1960.

The occurrence of a very active TMV inhibitor in *Cetraria islandica* has already been reported [**39**, 43]. In further studies at the Dept Plant Physiol., Łódż Univ., Poland, again using *Nicotiana glutinosa* as a test plant, the same phenomenon was observed in *Evernia prunastri*, *Xanthoria parietina*, *Parmelia furfuracea*, *P. physodes*, and *Ramalina fraxinea*. The extract of *Parmelia furfuracea* (the most

active) was particularly effective when applied by sprinkling 10–30 min. after inoculation, but exerted a noticeable influence when the treatment was given 5 hr. before or after inoculation. As for *C. islandica*, it was active at a final dilution of 10^4 and was thermostable.

OKA (H.), YOSHINO (K.), & NAKATOGAWA (H.). **Inoculation techniques for evaluating resistance to Cucumber mosaic virus by necrotic strain. I. Virus concentrations in Vinca rosea.**—*Bull. Hatano Tob. Exp. Sta.* 44, pp. 101–110, 1 pl., 2 graphs, 1959. [Jap. Abs. from Engl. summ.]

A str. of cucumber mosaic virus which caused necrotic local lesions on tobacco [**37**, 598] was maintained in *Vinca rosea* in the greenhouse at 28° C. The most adequate inoculum for tobacco was obtained from all leaves of *V. rosea* 2 weeks after inoculation, and used at 1:50. About 100 lesions were induced on the susceptible Bright Yellow.

OKA (H.), YOSHINO (K.), & NAKATOGAWA (H.). **Varietal variation of resistance to Cucumber mosaic virus in Tobacco.**—*Bull. Hatano Tob. Exp. Sta.* 44, pp. 111–118, 1959. [Jap. Abs. from Engl. summ.]

A susceptibility index of tobacco vars. to a str. of cucumber mosaic virus inciting necrotic local lesions on tobacco [see above] was calculated on the basis of the number of lesions produced. Vars. with an index < 20 were considered resistant, and included T.I. 245, Hicks Broadleaf, Stamm 12, and Turkish Samsun.

Outbreaks and new records.—*F.A.O. Plant Prot. Bull.*, **9**, 2, p. 29, 1960.

R. CIFERRI (Univ. Pavia) records the occurrence of *Peronospora tabacina* [**40**, 324] in many parts of Italy in 1960. The losses were very severe, in Lombardy alone about 20% of the area planted with tobacco being destroyed. According to information received the disease occurred in 4 different places in S.E. England in 1958; in 1959 it was found in the Netherlands, and in 1960 also in Belgium, France, Germany, and Austria [cf. **40**, 248].

LEA (H. W.). **The quest for a blue mould resistant Tobacco.**—*Agric. Gaz. N.S W.*, **71**, 12, pp. 639–642, 2 fig., 1960.

At the New England Exp. Farm, N.S.W. Dept Agric., *Nicotiana debneyi* × *N. tabacum* amphidiploid hybrids obtained from Canada in 1953 were used as the male parent carrying resistance to *Peronospora tabacina* [**39**, 624 *et passim*] and backcrossed 4 times to the tobacco var. Hicks. During 1959–60 2 lines of good commercial appearance combined with high field resistance to blue mould were being tested extensively in Australia and the U.S.A. and it is hoped that seed will be released for the 1961–2 season.

OHASHI (Y.) & MURAI (T.). **Studies on black root-rot resistance of Tobacco. I. Varietal variation. II. Relationship between resistance and stage of seedling. III. Variation in pathogenicity of Thielaviopsis basicola.**—*Bull. Hatano Tob. Exp. Sta.* 44, pp. 65–74, 2 pl.; pp. 75–82, 3 pl., 1 graph; pp. 83–89, 1 pl., 1 diag., 1959. [Jap. Abs. from Engl. summ.]

Varietal reaction to *T. basicola* was assessed from the root condition of 75 tobacco vars. and 2 *Nicotiana* spp. grown in infested soil in the greenhouse for 4 weeks. Highly resistant were the flue-cured Virginia Gold, Riwaka 3, 4, and 5, Virginia 21, and Harrison Special, all Burley vars., European vars., and *N. debneyi* and *N. plumbaginifolia*; and the native vars. Nanbuha and Higashineha.

When seedlings of 4 tobacco vars. sown in infested soil were transferred to the plant bed the susceptible var. Bright Yellow was severely stunted, while the resistant Virginia Gold, Delcrest, and Hicks grew more vigorously. When plants at 4, 5,

6, and 7 weeks were transplanted to infested soil in the greenhouse, Bright Yellow showed a high disease index at all ages, but the index of the resistant vars. decreased with an increase in age and growth rate increased. It is therefore important to keep plant beds free from black root rot when growing moderately resistant vars. such as Delcrest and Hicks.

Twelve isolates of *T. basicola* obtained from a tobacco field in Horai-cho, Aichi-ken differed in pathogenicity but not in growth on carrot extract agar at 25° C. In greenhouse seedling tests weakly pathogenic isolates infected the moderately resistant Delcrest and Yellow Special A very slightly, those of intermediate pathogenicity infected these vars. moderately, while highly virulent ones infected them severely.

OHASHI (Y.) & MURAI (T.). **Studies on black shank resistance of Tobacco. I. Varietal variation.**—*Bull. Hatano Tob. Exp. Sta.* 44, pp. 93–100, 2 pl., 1959. [18 ref. Jap. Abs. from Engl. summ.]

In greenhouse tests 5-week-old seedlings of 71 tobacco vars. and 6 *Nicotiana* spp. were inoculated with a mycelial suspension of *Phytophthora parasitica* var. *nicotianae*. All the native vars. were very susceptible, most being killed in 7 days. The flue-cured vars. Dixie Bright 101, Dixie Bright 102, Coker vars., Vesta vars., Oxford vars. (except 26), and Hicks were resistant. *N. longiflora* and *N. plumbaginifolia* were immune; Burley 11 A, Florida 301, Dixie Shade, and Ambalema were all highly resistant.

POWELL (N. T.) & NUSBAUM (C. J.). **The black shank-root knot complex in flue-cured Tobacco.**—*Phytopathology*, **50**, 12, pp. 899–906, 3 fig., 1960.

An expanded account of information already noticed on the complex involving *Phytophthora parasitica* var. *nicotianae* and nematodes [**39**, 45].

LUCAS (G. B.). **Control of Tobacco brown spot by field spraying with dyrene.**—*Plant Dis. Reptr*, **45**, 3, p. 159, 1961.

At N. Carol. State Coll., Raleigh, plots of the tobacco vars. NC 73, NC 75, Coker 187, and Coker 187-Hicks which received 3 applications at weekly intervals (from just after flowering) of 2 lb. wettable dyrene/100 gal. water at 150 gal./acre yielded 230 lb./acre more tobacco than the unsprayed. All plots were infected with brown spot (*Alternaria longipes*) [cf. **34**, 617]; opt. timing of spray control is dependent on the weather.

SMILEY (J. H.) & STOKES (G. W.). **Resistance to the wildfire disease in relation to the gene-chromosome set ratio in Tobacco.**—*Phytopathology*, **51**, 3, pp. 174–175, 1961.

A full account of studies on *Pseudomonas tabaci* at Ky agric. Exp. Sta., Lexington [**40**, 186].

OKA (H.) & NAKAMURA (A.). **Studies on the testing method of resistance to wildfire of Tobacco. Relationship between inoculum concentration and resistance.**—*Bull. Hatano Tob. Exp. Sta.* 44, pp. 119–128, 3 pl., 1 fig., 6 graphs, 1959. [Jap. Abs. from Engl. summ.]

Typical necrotic lesions were induced on the resistant vars. Burley 21 and TL 106, and *Nicotiana longiflora*, as well as on the susceptible Bright Yellow by 1:10 and 1:100 dilutions of *Pseudomonas tabaci* [**37**, 185] applied by the water soaking method. Symptoms were produced only on Bright Yellow and Burley 21 by 1:1,000 and on Bright Yellow by 1:10,000 and 1:100,000. When the spraying method was used infection occurred on Burley 21 and TL 106 at 1:10 dilution, on Burley 21 at 1:100, and on none of the resistant vars. at 1:1,000. At all dilutions infections were severe on Bright Yellow.

MAINE (E. C.). **Physiological responses in the Tobacco plant to pathogenesis by Pseudomonas solanacearum, causal agent of bacterial wilt.**—*Diss. Abstr.*, 21, 5, pp. 1016–1017, 1960.

The invasion of tobacco stem tissue by *P. solanacearum* [cf. **38**, 279], investigated at N. Carolina State Coll., was accompanied by marked rise in the rate of O uptake. Such increase also occurred in leaf tissues of inoculated plants without any bacterial invasion or wilting symptoms. On a dry wt. basis polyphenol oxidase activity doubled in affected stem tissues; a positive correlation existed between increased activity and increased O uptake at different stages of disease development. Increased polyphenol oxidase activity may account for part of the increased O consumption in the diseased stem tissues after the initial phases of pathogenesis. Extra-cellular hydrolytic enzymes produced by *P. solanacearum* affect the structural integrity of host tissues and may be important factors in the initiation of enhanced O uptake rather than toxins which affect the essential physiological processes of host tissues.

OKA (H.) & OHASHI (Y.). **Varietal variation of resistance to bacterial wilt in Tobacco. Breeding of flue-cured Tobacco resistant to bacterial wilt.**

OHASHI (Y.) & KUNISAWA (K.). **Studies on bacterial wilt resistance of Tobacco. I. Relationship between the host age and resistance. II. Relationship between root injury and bacterial invasion.**—*Bull. Hatano Tob. Exp. Sta.* 44, pp. 1–16, 4 pl.; pp. 17–38, 6 pl.; pp. 39–50, 1 pl.; pp. 51–60, 3 pl., 8 graphs, 1959. [Received Apr. 1961. Jap. Abs. from Eng. summ.]

At Hatano Tobacco Exp. Sta, Japan, more than 150 plants of 4 strs. from susceptible Bright Yellow (flue-cured)×native (air-cured) vars. resistant to *Pseudomonas solanacearum* [**37**, 185; cf. **39**, 621] and 20 flue-cured vars. from the U.S.A. were grown in a heavily infested field.

Bright Yellow (BY) had 81·9% diseased plants, while the percentages for the resistant selections were: BY×Odharumaha No. 22, 12·3%; B.Y.×Odharumaha No. 17, 33·4%; B.Y.×Awaha, 28·5%; B.Y.×Eushuha, 30·8%; Oxford 26, 9·8%; Dixie Bright (DB) 27, 9·8%; Golden Wilt, 11·8%; DB 101, 2·5%; DB 102, 3·5%; Oxford 202, 4·3%; DB 244, 1·3%; Coker 139, 2·5%; DB 28, 5·0%; D.S.P.A., 22·3%; and Oxford 2, 45·6%. Narrow leaf selections from Oxford 26 and Golden Wilt were completely susceptible.

Selections for resistance were made by growing self-pollinated plants from Oxford 26×BY in a field so infested that 90% susceptible plants became infected. Selections from a line in the F_3 with 12·2% diseased plants gave highly resistant plants in the F_6. The resistance of 8111 and 8342 was equal to that of Oxford 26 but they had undesirable curing qualities: when crossed with DB 101 and 244 promising selections were obtained.

In order to determine opt. conditions for screening resistant lines in the greenhouse 5–8-week-old seedlings of resistant DB 101 or susceptible BY were transplanted to a steam sterilized bed and inoculated by root injury or by pouring diluted bacterial suspensions over wounded roots at high R.H. and temp.

BY plants were severely wilted regardless of age and inoculum conc. Five-week-old DB 101 seedlings were severely wilted at all inoculum concs; in 6-week-old seedlings disease incidence increased with inoculum conc. (1:5 to 1:100), and in 8-week-old plants resistance was much higher. Resistant plants may be selected at 6 weeks if dilute inocula are employed.

Bacterial wilt was most severe in the susceptible vars. Little Dutch, Delcrest, and BY when the plants were inoculated with a bacterial suspension immediately after the roots were injured by cutting. Plants inoculated 24–48 hr. after cutting or without cutting showed few symptoms. The development of wilt in BY in soil

infested with *Meloidogyne incognita* and *P. solanacearum* was slower than in plants inoculated immediately after cutting. On the other hand, resistant DB 101 plants wilted as rapidly in soil inoculated with bacteria alone as in soil containing both nematodes and bacteria. It is concluded that the entry of bacteria into tobacco roots is facilitated by nematode injury, to which Dixie Bright is more susceptible than Bright Yellow.

KOVACHEVSKI (I.). Изследвания върху жилковата некроза по Домата. [Studies on vein necrosis in Tomato.]—*Res. in memoriam Doncho Kostov*, pp. 143–172, 47 fig., 1960. [Russ., Germ. summ.]

An apparently new virus disease was noticed by the Inst. Plant Prot., Sofia, Bulgaria, in many gardens where tomatoes were grown near shrubs and other perennials. The symptoms, identical with those observed by the author on tomatoes in Tsingtao, N.E. China, included severe vein necrosis of the leaves, necrotic streaks on the stems, and shoot die-back; affected fruits were non-edible, with sunken areas and black, necrotic veins. The virus was sap transmitted (best at lower temp. and with 0·5% Na_2SO_3) to a wide range of hosts but not to potato. Of 66 tomato vars. and 7 *Lycopersicon* spp. inoculated none was immune. On Samsun tobacco the 3–4 leaves above the inoculated one developed chlorotic oak-leaf or ring patterns along the veins. Symptoms on cucumber, *Chenopodium quinoa*, spinach, and red pepper [*Capsicum*] resembled those of cucumber mosaic virus (CMV). The tomato virus was transmitted by *Myzodes* [*Myzus*] *persicae*, *Doralis* [*Aphis*] *fabae*, and *D.* [*A.*] *frangulae* from tobacco and cucumber to the same hosts, and in one case to tomato. Inactivation *in vitro* occurred at room temp. in 2–5 days, and at 5° C. in 20; the thermal inactivation point was 57°, the dilution end point 1:2000.

In nature the vein necrosis virus and CMV often occur on the same plant, but the N^t str. of CMV did not infect tobacco leaves containing vein necrosis virus. Since the common CMV str. confers resistance to N^t in tobacco it is inferred that the vein necrosis virus is a var. of CMV close to the N^t str.

SCHROEDER (W. T.). & PROVVIDENTI (R.). **Rhizoctonia fruit rot of processing Tomatoes.**—*Plant Dis. Reptr*, **45**, 3, pp. 160–163, 6 fig., 1961.

During the unusually dry season of 1960 processing tomatoes in western N.Y. were severely affected by a fruit rot due to *Rhizoctonia* sp., evident as dark red, water-soaked lesions of varying size on ripe fruit. The disease was most severe on light, sandy soils, and the pathogen was able to attack only through epidermal wounds.

BARR (RITA). **Variation in the Tomato leaf mold organism, Cladosporium fulvum Cke.**—*Diss. Abstr.*, **21**, 5, pp. 1015–1016, 1960.

At Purdue Univ., Ind., all clones derived from a single spore of *C. fulvum* [cf. **37**, 422] showed remarkable similarity and constancy of colour and cultural characteristics up to the 14th day. Thereafter yellow or white colour variants began to appear as pinpoint patches on top of the olive green mycelium. Biochemical mutants produced by spore irradiation with UV light are described. Anastomoses were detected in both single and mixed cultures. Binucleate spores occurred with a frequency of 1:200 in both parental types.

COHN (E.) & MINZ (G.). **Ha-nematodot wa ʿamidut ʿAgbaniyot la-mogelet.** [Nematodes and resistance of Tomato to *Fusarium* wilt.]—*Hassadeh*, **40**, 12, pp. 1347–1349, 1960. [Heb. From author's summ.]

At the Agric. Res. Sta., Rehovot, Israel, the susceptible tomato var. Marmande was inoculated in the greenhouse with *Fusarium* [? *bulbigenum* var. *lycopersici*] and the root-knot nematodes *Meloidogyne hapla* and *M. incognita* [cf. **39**, 246],

also the resistant Eilon and the experimental var. 55 N. 10, which is partially resistant to the nematodes. Marmande wilted when inoculated with *F.* alone and with *F.*+nematodes, Eilon only with fungus+nematodes, and 55 N. 10 slightly with both. *M. hapla* was slightly more effective in breaking down resistance than *M. incognita*. Resistance in Eilon and 55 N. 10 was not broken down when roots were wounded; it seems therefore that the break-down process is more complex than a consequence of simple mechanical injury to the roots.

Nayudu (M. V.) & Walker (J. C.). **In vitro nutrition of the Tomato bacterial spot organism.**—*Phytopathology*, **51**, 1, pp. 32–34, 1961.

A full account of studies on *Xanthomonas vesicatoria* [**40**, 250].

Zycha (H.). **Die kranken Buchen : Ursachen und Folgerungen.** [Diseased Beeches: causes and conclusions.]—*Holzzentralbl.* 146, 8 pp., 6 fig., 1960.

This bark necrosis [**39**, 742], widespread in N.W. Germany in 1960, was found at Hann. Münden to be due to lack of water in the previous dry summer and not to fungus or insect attack.

Levisohn (I[da]). **Physiological and ecological factors influencing the effects of mycorrhizal inoculation.** *New Phytol.*, **59**, 1, pp. 42–47, 1960. [9 ref.]

Pot experiments at Bedford Coll., Univ. London, showed that the depressing effect of *Boletus scaber* on birch in a Yorkshire heathland soil [**38**, 715] was due mainly to the rhizosphere activity of the inoculum and to the presence of a deleterious pseudomycorrhiza-former. *Mycelium radicis atrovirens* β (less common than the more innocuous type α). Although *B. scaber* is not generally a mycorrhiza-former for *Pinus* it induced mycorrhizal infection and simultaneous stimulation of growth of *P. sylvestris* [**40**, 189] in sterilized sand.

Vaartaja (O.), Cram (W. H.). & Morgan (G. A.). **Damping-off etiology especially in forest nurseries.** –*Phytopathology*, **51**, 1, pp. 35–42, 1961. [45 ref.]

In joint studies by the Canada Agric. Res. Sta., Saskatoon, and the For. Nursery Sta., Indian Head, Sask., the most common fungi isolated from diseased tree seedlings in forest nurseries [**36**, 216] were *Rhizoctonia* [*Corticium*] *solani*, *Phytophthora cactorum*, *Pythium debaryanum*, *P. ultimum*, *Fusarium* spp., and *Cylindrocarpon* spp. Many isolates of these were strongly pathogenic when inoculated on tree seedlings grown aseptically in test-tubes. When Scots pine and *Caragana* seed was sown in unsterilized soil inoculated with culture suspensions of the first 3 spp. the pathogenic effects were masked by those of the natural soil flora, but when inoculum took the form of an infested seed soil mixture all isolates caused high mortality. An isolate of *Thielariopsis basicola*, not known to be associated with damping-off, was also highly pathogenic.

It is suggested that etiological studies on damping-off should be carried out under sterile conditions. The importance of individual pathogens may be assessed by epidemiological and ecological investigations.

Al-Azawi (A. F.), Norris (D. M.), & Casida (J. E.). **Hazards associated with the implantation of tetram into Elm trees for Dutch Elm disease control.** –*J. econ. Ent.*, **54**, 1, pp. 127–129, 1961.

The results of experiments at Dept Ent., Univ. Wis., Madison, demonstrated the efficiency of tetram (*O,O*-diethyl *S*-(β-diethylamino)-ethyl phosphorothiolate H oxalate) in the prevention of elm infection by *Ceratocystis ulmi* through control of the vector *Scolytus multistriatus*. However, the chemical is of such high general toxicity to mammals and earthworms that a number of risks would be involved in its large-scale use.

HIMELICK (E. B.) & NEELY (D.). **Prevention of bark beetle development in undesirable Elms for the control of Dutch Elm disease.**—*Plant Dis. Reptr*, **45**, 3, pp. 180–184, 1 graph, 1961.

The Ill. Nat. Hist. Surv., Urbana, found that of 36 chemicals tested only Na arsenite (40 g./l.) gave complete control of elm bark beetles (*Scolytus multistriatus* and *Hylurgopinus rufipes*), vectors of *Ceratocystis ulmi* [**39**, 628; **40**, 129]. In field studies in 3 areas of N. Ill. 97% control of *C. ulmi* was obtained when elms were so treated during the early stages of the disease.

VAN DER WESTHUIZEN (G. C. A.). **Polyporus sulphureus, a cause of heart-rot of Eucalyptus saligna in South Africa.** –*J.S. Afr. For. Ass.* 33, pp. 53–56, 1959. [*For. Abstr.*, **22**, 1, p. 94, 1961.]

The paper describes the rot and the cultural characters of the fungus. *P. sulphureus* occurs mainly in timber from old stands, and in the material from the Zululand coast heavy damage was present in 40-yr.-old stands, though 8-yr.-old trees were unaffected.

McMULLEN (L. H.), SHENEFELT (R. D.), & KUNTZ (J. E.). **A study of insect transmission of Oak wilt in Wisconsin.**—*Trans. Wis. Acad. Sci. Arts Lett.*, **49**, pp. 73–84, 2 graphs, 1960.

In further studies [cf. **34**, 757] it was found that certain sap-feeding insects play an important role in the long distance spread of oak wilt (*Ceratocystis fagacearum*) [**39**, 629]. Six spp. of Nitidulidae, *Drosophila* sp., and 1 sp. of Staphylinidae were collected from mycelial mats on diseased trees and from wounds on healthy trees. Infection occurred only from mid-May to mid-June in trees in which wounds, made throughout the season, were left open for natural insect visitation. Incidence was closely correlated with the numbers of insects visiting the wounds. In caging experiments from 1 May–mid-Oct. wilt developed in 29 of 144 test trees. Positive results occurred during 2 periods: one in May and June, the other in Aug. Ascospores in inoculum to which insects were exposed did not increase the percentage infection compared with inoculum containing endoconidia only.

PARTRIDGE (A. D.). **The Oak wilt fungus in wood.**—*For. Prod. J.*, **11**, 1, pp. 12–14, 2 fig., 1 graph, 1961.

In tests against *Ceratocystis fagacearum* [cf. **38**, 489; **39**, 628] at the Central Forest Exp. Sta., Univ. Missouri, Columbia, with 15 commonly available chemicals with known or surmised fungitoxic fumes, used in a specially constructed chamber with an internal vol. of 250 l., the chemicals (liquids at 70° F. and atmospheric pressure) were placed in the chamber in amounts sufficient to provide 250 ml. of active ingredient; gases were injected from external cylinders until the atmosphere was saturated.

In the 1st test 20 10-day-old slants of *C. fagacearum* on V-8 agar were exposed to each fumigant. In the 2nd, each successful chemical was used on 10 small sterilized, inoculated sections each of *Quercus velutina* and *Q. alba* stems. In the final test, each fumigant successful in the 2nd test was used on sections 3–4 in. diam., 8 in. long, and with intact bark, infected by 21 days' exposure to the fungus. At first, exposure to the fumigants was for 7 days, but later the period was reduced to 3.

Only chloropicrin and methyl bromide killed the fungus in 3 days. With 7 days propylene oxide was also successful. Chlorine, though fungitoxic, did not penetrate the wood thoroughly.

Sooty bark disease of Sycamore—Cryptostroma corticale.—*Entopath News* 29, pp. 3–4, 1961. [Cyclostyled.]

This disease [**36**, 794] declined during the early 1950's and although high temp.

favoured the pathogen in culture, no increase in incidence was observed following the hot summer of 1955. After the exceptionally dry summer of 1959, however, a survey of *Acer pseudoplatanus* in the London area revealed an increased attack, though not as severe as the original outbreak in the late 1940's.

McAlpine (R. G.). **Hypoxylon tinctor associated with a canker on American Sycamore trees in Georgia.**—*Plant Dis. Reptr*, **45**, 3, pp. 196–198, 2 fig., 1961.

It is reported from Forest Service, U.S. Dept Agric., Asheville, N. Carol., that during 1960 20 *Platanus occidentalis* trees in an area which had been thinned 5 yr. previously had severe cankers, 8 of them being killed. *Hypoxylon tinctor* was associated with all these cankers, being found on living trees for the 1st time.

Butin (H.). **Die Krankheiten der Weide und deren Erreger.** [Diseases of Willow and their causes.]—*Mitt. biol. BdAnst. Berl.* 98, 46 pp., 27 fig., 1960. [3½ pp. ref.]

This useful monograph from the Inst. der Forstpflanzenkrankheiten, Hann. Münden, on diseases of *Salix* in Germany and elsewhere deals with 3 bacteria and 28 fungi found on the leaves and wood. For the more important diseases details are given of symptoms, morphology and biology of the pathogen, varietal susceptibility, distribution and spread, and control.

Wiejak (Krystyna). **Obserwacje nad występowaniem zgorzeli pędow Wikliny powodowanej przez Physalospora miyabeana Fukushi.** [Studies on the occurrence of Willow shoot canker caused by *P. miyabeana*.]—*Biul. Inst. Ochr. Roś., Poznań, 1960*, 9, pp. 205–213, 1960. [Russ., Engl. summ. Cyclostyled.]

At Sadłowice near Puławy, Poland, the causal agent of willow (*Salix*) canker, *P. miyabeana* [cf. **39**, 445], was often accompanied by *Fusicladium saliciperdum* [*Venturia chlorospora*: cf. **37**, 115]. The role of the latter was not established: inoculation with both fungi produced infection only by *P. miyabeana*. The perithecia of both fungi overwintered on the shoots and constituted a source of infection in spring.

Low (J. D.). **Fomes annosus causing butt-rot and killing of conifers in England and Wales: A note for private estates on the need for protection.**—*Quart. J. For.*, **55**, 2, pp. 167–170, 1961.

This note stresses the seriousness of the expected spread of the disease [cf. **39**, 633 *et passim*], outlines its etiology and relation to environment, and describes protective measures by creosoting freshly cut stump surfaces.

Raymond (F. L.) & Reid (J.). **Dieback of Balsam Fir in Ontario.**—*Canad. J. Bot.*, **39**, 2, pp. 233–251, 1 pl. (6 fig.), 2 graphs, 1961. [26 ref.]

Dieback of *Abies balsamea*, caused by *Thyronectria balsamea*, *Valsa abietis*, and *Dermea balsamea* [**37**, 560] has decreased since 1955. In inoculation tests typical symptoms were caused by each of the 3 pathogens. It was shown that borer beetles (*Monochamus* spp.) act as vectors and dieback frequently developed from wounds made by the beetles in the presence of the fungi. It is concluded that dieback results from a combination of factors and a study of climatic conditions during the most severe outbreaks indicated that the condition was aggravated by hot, dry summers.

Gilmour (J. W.). **A root and stem canker of exotic conifers in New Zealand.**—*Tech. Pap. For. Res. Inst. N.Z. For. Serv.* 28, 19 pp., 10 pl., 1959. [*For. Abstr.*, **22**, 1, p. 95, 1961.]

In a full account of the disease it is stated that *Pinus radiata*, *P. taeda*, *P. elliottii*, *P. pinaster*, *P. nigra*, *Pseudotsuga taxifolia* [*P. menziesii*], *Chamaecyparis lawsoniana*,

Eucalyptus saligna, *Leptospermum scoparium*, and *Ulex europaeus* are attacked. First recorded in 1951 in the Glenbervie State Forest the disease occurs most frequently in N. Auckland, as well as elsewhere in N. and S. Islands, contact between the trees and the bracken (*L. scoparium*) apparently being the chief means of infection. The studies suggest that *Peniophora sacrata* is the causal organism.

Kalandra (A.), Uroševič (B.), & Šrot (M.). **Pozor na kalamitní usychání Borovic doprovázené cenangiosou.** [Warning of a calamitous dieback of Pines, accompanied by cenangiosis.]—*Lesn. Práce, 1960*, 8, pp. 361–363, 1960. [Abs. in *Landw. Lit. Tschechosl., 1960*, 2, p. 55, 1960.]

Severe attacks of this disease have caused the destruction of whole tracts of common and black pine [*Pinus nigra*]. A rusty discoloration of needles starts from the apex of the trees, which are attacked by *Cenangium ferruginosum* [cf. **38**, 189] and secondarily often by beetles (*Myelophilus piniperda* [cf. **39**, 741] in the trunks and *M. minor* in crowns and branches). Phytosanitary measures and the removal of dead trees are recommended.

Anderson (N. A.). **Studies of the effects of the Cronartium rusts on Jack Pine and the epidemiology of these fungi.**—*Diss. Abstr.*, **21**, 4, p. 721, 1960.

Studies at Univ. Minn. indicated that the spread of *C. comptoniae* [**38**, 282] between aecidial and uredial hosts is very limited. Infections usually occur before trees are 10 yr. old. Local jack pines [*Pinus banksiana*] were more resistant to *C. quercuum* [**39**, 251] and *C. comptoniae* than lodgepole [*P. contorta* var. *latifolia*] or hybrids between them. Symptoms of these rusts and of *C. coleosporioides* and *C. comandrae* appeared on jack pine 1 yr. after inoculation. In natural stands *C. comptoniae* killed trees of all ages, the most serious losses being of seedlings and mature and over-mature trees. In a 25-yr.-old plantation it reduced both height and diam. growth and exposed the tree to decay fungi. The rate of spread of decay was twice that of the vertical elongation. Trees infected by *C. quercuum* on the branches only were the tallest and most vigorous in the stand.

Actidione effectively controlled *C. comptoniae* on pole sized trees with cankers covering less than 75% of the circumference.

C. coleosporioides [**39**, 636] was found in Minn. for the 1st time, across the entire northern range of jack pine. Aecidiospores are rarely found on mature trees. *Melampyrum lineare* was the most important alternate host though *Castilleja coccinea* was susceptible to inoculation. *Cronartium comandrae* [**37**, 189] was also present throughout the range of jack pine. It was most severe on seedlings and saplings in the north-central part.

Ahlgren (C. E.). **Progress with direct bark inoculation for White Pine blister rust.** —*J. For.*, **59**, 3, pp. 208–209, 4 fig., 1961.

At the Quetico-Superior Wilderness Res. Centre, Ely, Minn., an entire ring of cankered bark containing active mycelium of blister rust (*Cronartium ribicola*) [cf. **40**, 193] was used as inoculum for 6–9-yr. old *Pinus strobus* trees. Of 25 inoculations made during 1957–8 14 transmitted the disease successfully, 7 trees died owing to graft failure, and on 4 disease symptoms disappeared and the trees remained healthy.

Peterson (R. S.). **Development of western gall rust in Lodgepole Pine.**—*Phytopathology*, **50**, 12, pp. 876–881, 5 fig., 1 graph, 1960.

At Univ. Mich. and the Rocky Mt. For. and Range Exp. Sta., Fort Collins, Colo., the vegetative morphology of *Peridermium harknessii* galls on *Pinus contorta* [**39**, 636] was shown to resemble that of other gall rusts. The lateral advance of the pathogen from the edge of a trunk canker is about twice the annual radial incre-

ment of the host: thus trunks are girdled very slowly and live galls 200 yr. old are common.

Peterson (R. S.). **Western gall rust cankers in Lodgepole Pine.**—*J. For.*, **59**, 3, pp. 194–196, 4 fig., 1961.

This further contribution [see above] notes that the trunk cankers of *Pinus contorta* caused by *Peridermium harknessii* result in considerable losses through timber malformation when the trees are cut.

Galo (J. B.). **Control of damping-off of Benguet Pine (Pinus insularis Endl.) in seedbeds with dowfume MC-2 and formaldehyde.**—*Philipp. J. For.*, **13** (*1957*), 3–4, pp. 201–211, illus., [1959]. [*Biol. Abstr.*, **36**, 4, p. 1012, 1961.]

Seed-bed treatment significantly reduced incidence of damping-off (*Rhizoctonia* spp. and *Pythium* spp.), very destructive in lowland nurseries, dowfume MC-2 being more effective than formalin and freeing the soil from weeds almost completely.

Goss (R. W.). **Mycorrhizae of Ponderosa Pine in Nebraska grassland soils.**—*Res. Bull. Neb. agric. Exp. Sta.* 192, 47 pp., 10 fig., 1960. [33 ref.]

In a preliminary study of the mycorrhiza of *Pinus ponderosa* [cf. **37**, 334, 577, *et passim*], which are described, it was found that occurrence in virgin grassland soils in the greenhouse was relatively rare compared with natural forested areas in E. United States or soil from pine nurseries. Mycorrhiza were more abundant in the autumn than in the spring, and in many soils were present only at considerable depth. Many persisted for at least 2 yr., with successive elongations. The most prevalent form was associated with an unidentified basidiomycete and was ectotrophic, with coralloids, mantles, and rhizomorphs. Mycorrhiza could be established by inoculation with a duff-soil mixture from a pine wood. Severe chlorosis of *P. ponderosa* seedlings in some virgin grassland soils was prevented or diminished by inoculations with the soil mixture, which induced mycorrhiza formation. More mycorrhizal than non-mycorrhizal seedlings were able to survive the withholding of all watering for 17 days.

Gibson (I. A. S.). **Armillaria root rot in Kenya Pine plantations.**—*Emp. For. Rev.*, **39**, 1, pp. 94–99, 1960.

A survey in 1953–59 showed that *A. mellea* [**40**, 436] was more severe in pine plantations following montane rain forest than after montane conifer forest. Infection is carried by eucalyptus and cypress. Five-yr.-old plantations were most severely affected, the host increasing in resistance with age. *Pinus radiata* and *P. patula* were more resistant than *P. elliottii*.

Troxell (H. E.). **Progress in wood preservation, 1959–60.**—*For. Prod. J.*, **11**, 2, pp. 67–76, 6 fig., 1961. [331 ref.]

This 6th annual progress report [cf. **39**, 639] includes accounts of the new swing to 'result-type specifications', new methods of testing preservatives, volume of preservatives used and timber treated, a new incising machine for full-length round timbers, success of wood-pole structures, and current and future research projects.

Blew (J. O.). **Comparison of wood preservatives in stake tests.**—*Rep. For. Prod. Lab., Madison*, 1761, 8+48 [unnumbered] pp., 1 fig., 1961.

This report is on the usual lines [cf. **38**, 108].

Kalnin'sh (A. I.) & Murashchenko (N. F.). Антисептирующие свойства производных лигносульфоновых кислот. [The antiseptic properties of lignosulphone acid derivatives.] *Ex* Вопросы химии и технологии древесины

[Problems of the chemistry and technology of wood.]—Труд. Инст. лес.-хоз. Проблем Хим. Древес. [*Trud. Inst. les.-khoz. Problem Khim. Dreves.*] 19, pp. 201–206, 1960.

At the Inst. Forestry Problems and Wood Chemistry, Latvian Acad. Sci., Riga, preparations obtained by the condensation of lignosulphonates with phenols (of the tannin type) were most toxic against *Coniophora cerebella* [*C. puteana*: **40**, 134] on pine wood samples, Cu, Zn, and Cd lignosulphonates particularly so. Toxicity and resistance to leaching were higher for salts obtained by autoclaving under high pressure than under atmospheric pressure, which may be explained by an increase in the number of phenolic hydroxyl groups in the lignosulphone acid molecule. This preliminary study shows that the antiseptic properties of the lignosulphone complex of sulphite alkalis and sulphite liquor could be improved.

Kalnin'sh (A. I.) & Kalninya (Mme E. P.). Перспектибы антисептирования древесины нафтенатами. [Prospects of wood preservation with naphthenates.] *Ex* Вопросы химии и технологии древесины [Problems of the chemistry and technology of wood.]—Труд. Инст. лес.-хоз. Пробдем Хим. Древес. [*Trud. Inst. les.-khoz. Problem Khim. Dreves.*] 19, pp. 207–212, 1960.

In lab. tests at the Inst. Forestry Problems and Wood Chemistry, Latvian Acad. Sci., Riga, it was established that a 0·25% solution of Cd naphthenate (min. conc. for preservation) had the highest fungicidal activity against *Coniophora cerebella* [*C. puteana*: see above] on agar and on blocks of pine sapwood (1×1·5×3 cm.); 0·5% Cu naphthenate was comparatively effective, 2% Zn naphthenate had some preservative effect, while that of 5% naphthenate was very slight. Cu naphthenate (1%) was less liable to leaching than Cd naphthenate, while Zn and Ba naphthenates leached very easily.

Clark (J. W.). **Decay resistance of experimental and commercial particle board.**—*Rep. For. Prod. Lab., Madison*, 2196, 5+3 [unnumbered] pp., 1 fig., 1960.

This paper discusses the effectiveness of treatments aimed at improved termite and decay resistance in particle board by means of preservatives and tabulates data. Using the standard soil-block technique with southern pine sapwood feeder blocks during 12 weeks' exposure the results obtained with *Poria monticola* reflected more closely the comparative resistance to be expected of materials under severe conditions, while those with *Lenzites trabea* seem more useful in estimating relative decay resistance of materials under moderate conditions.

Becker (G.) & Starfinger (Käthe). **Zur vergleichenden Prüfung des Eindringvermögens von Holzschutzmitteln bei handwerklicher Anwendung.** [On comparative testing of the penetration potential of wood preservatives for use in handicraft.]—*Holz a. Roh- u. Werkst.*, **18**, 12, pp. 458–468, 4 fig., 3 graphs, 1960. [Engl. summ. 18 ref.]

At the Bundesanstalt für Materialprüfung, Berlin-Dahlem, wood preservatives applied by brushing [**38**, 634], according to the German standard DIN 52618, to pine sapwood showed a penetration depth differing between various places on the same sample < 100% (av. 25–30) of the average and between different logs < 60 (av. under 25). Penetration parallel to the rays is 1·4–2·3 times deeper than parallel to the rings, except with HF and at an angle < 45°, in which cases it is equal; it is reduced in wood with narrow rings, in samples with fibres not parallel to the surface, and in specimens with a rough surface. The av. penetration of NaF was 2·3·1–3·4 and 4–5·8–7·4 mm. in wood with respectively 12 and 18% moisture content (as compared with 2·1–3·5–4·8 of carbolineum according to DIN 52618). Since penetration varies with the properties of wood, suggestion is made for a change of the standard quoted.

ZUR LIPPE (TRAUTE) & NESEMANN (G.). **Über die Fruchtkörperbildung von Merulius lacrymans domesticus Falck.** [On the fruit body formation of *M. l. domesticus*.] —*Arch. Microbiol.*, **34**, 2, pp. 132–148, 4 graphs, 1959.

At the Inst. Plant Physiol., Göttingen Univ., fruit body formation by *M. lacrymans* was promoted by light (9 hr. day, 400–600 lux) and low temp. (16° C.). On agar nutrient media with sucrose 16 of 22 amino acids and amides were favourable, DL-α-alanine being the best N source in both agar and in liquid cultures; KNO_3 and NH_4Cl could be used provided the N conc. was not excessive. Higher concs. of DL-α-alanine were needed with a poorer sugar (glucose) or with less sucrose.

MADOSINGH (C.). **Tolerance of some fungi to a water-soluble preservative and its components.**—*For. Prod. J.*, **11**, 1, pp. 20–22, 2 graphs, 1961.

At Ottawa Lab., Forest Products Labs. of Canada, a determination was made of the lethal and min. growth conc. of a preservative mixture (NaF 34%, K dichromate 34%, Na arsenate 25%, and 2,4-dinitrophenol 7%) and of its individual components against *Coprinus micaceus* and *Fusarium oxysporum*, found associated in decaying fence posts after treatment, *Polyporus adustus* and *Lenzites saepiaria* being included in some of the tests for comparative purposes.

F. oxysporum was easily the most tolerant to all the chemicals, except the NaF and K dichromate mixtures, *C. micaceus* the least.

In a medium containing the complete preservative there was progressively less growth of *C. micaceus* as the conc. of the preservative increased from 0·03 to 0·11%. Min. growth occurred at 0·02% and the fungus was killed at 0·15%. With the individual components min. growth occurred at 0·1% NaF and death at 0·15%; for NaF.+dichromate the corresponding figures were 0·2 and 0·5%. In Na arsenate +NaF it was killed at 0·2%, and in K dichromate+Na arsenate at 0·5%. For K dichromate+dinitrophenol min. growth occurred at 0·02 and death at 0·05%.

Usually the lethal and inhibitory concs. of a mixture depended on the lethal and inhibitory concs. of the most toxic component, though in certain instances the antagonistic action of 1 compound was diminished by the complementary action of another. The temp. and humidity of the incubation room reduced the toxic effects of the treatments. The evidence indicated that *F. oxysporum* has an extensive enzyme system, both active and latent. It is suggested that it entered the treated posts and in some way reduced the toxicity of the preservative, so facilitating the entry and spread of *C. micaceus*.

VERRALL (A. F.). **Brush, dip, and soak treatments with water-repellent preservatives.**—*For. Prod. J.*, **11**, 1, pp. 23–26, 2 fig., 1961.

The results are presented of tests begun in S. Mississippi in 1941 with on-the-job preservatives, particularly water-repellents, for use on porches, steps, and exterior woodwork generally [cf. **29**, 69; **34**, 418; *et passim*]. On treated and untreated wood the fungi most commonly present were *Lenzites saepiaria* and *Daedalea berkeleyi*. The data obtained (on southern pine) showed that when all the factors are considered the preservatives covered by Federal Specification TT-W-572 (pentachlorophenol and Cu napthenate) are at least as good as the many others tested for protecting wood by surface application, particularly if a water repellent is used. Cu naphthenate at 1–2% Cu was effective. As only a surface treatment results from simple applications of water-repellent preservatives the wood should be cut to size and shape before treatment and any new cut surfaces treated again.

GIBSON (I. A. S.). **A note on variation between isolates of Armillaria mellea (Vahl ex Fr.) Kummer.**—*Trans. Brit. mycol. Soc.*, **44**, 1, pp. 123–128, 1 pl., 2 fig., 1961. [11 ref.]

At the Kenya For. Dept local isolates of *A. mellea* [**40**, 569] were compared with

140 others from world-wide sources, including 38 from E. Africa, on the bases of morphology and temp. relationships. Variations in type of mycelium and rhizomorph are noted, and tabulated in relation to geographical origin.

Lyr (H.). **Die Bildung von Ektoenzymen durch holzzerstörende und holzbewohnende Pilze auf verschiedenen Nährböden. I. Pectin als C-Quelle. II. Cellulose als C-Quelle. III. Amylum als C-Quelle. IV. Xylan und Glucose als C-Quellen.** [The formation of ectoenzymes by wood-destroying and wood-inhabiting fungi on various culture media. I. Pectin as a C source. II. Cellulose as a C source. III. Starch as a C source. IV. Xylan and glucose as C sources.]—*Arch. Mikrobiol.*, **33**, 3, pp. 266–282, 10 graphs; **34**, 2, pp. 189–203, 10 graphs; 3, pp. 238–250, 10 graphs; 4, pp. 418–433, 14 graphs, 1959.

These studies were carried out at the Inst. für Forstbotanik, Eberswalde, Germany.

Bochow (H.). **Über die Beeinflussung von Plasmodiophora brassicae Wor. durch Mineralsalze.** [On the influence of mineral salts on *P. brassicae.*]—*Phytopath. Z.*, **40**, 4, pp. 420–421, 1961.

In further studies at Inst. Phytopath. und Pflanzenschutz, Univ. Rostock, Germany [cf. **39**, 513], germination tests with resting spores of *P. brassicae* over 7 days in Knop solution of various conc. in quartz sand in which mustard seedlings were grown showed that a given nutrient content of a medium can have a direct influence on the fungus, as well as on the growth of the plant.

Knösel (D.). **Eine an Kohl blattfleckenerzeugende Varietas von Xanthomonas campestris (Pammel) Dowson.** [A variety of *X. campestris* inducing leaf spot on Cabbage.]—*Z. PflKrankh.*, **68**, 1, pp. 1–6, 2 fig., 1961. [Engl. summ.]

In further studies at the Inst. für Pflanzenschutz der landwirtschaftlichen Hochschule, Stuttgart-Hohenheim, the leaf spot bacterium from cauliflower [**38**, 636] differed only slightly from authentic isolates of *X. campestris* in cultural and biochemical tests but was noticeably more virulent when needle inoculated to several *Brassica* vars. in the greenhouse. In the field cauliflower vars. sprayed with a suspension of the leaf spot pathogen developed numerous small, necrotic spots without infection of the vascular bundles, whereas *X. campestris* caused typical black rot. On red cabbage both pathogens produced irregular, sunken flecks, but white cabbage was scarcely susceptible to the leaf spot pathogen. The bacterium is considered to be a new var., *X. c.* var. *aberrans*, highly virulent to cauliflower.

Schneider (Roswitha). **Über einen bemerkenswerten Befall an Kohlrabi, verursacht durch Phoma lingam (Tode) Desm.** [On a noteworthy disease of Kohlrabi caused by *P. lingam.*]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **13**, 2, pp. 26–28, 5 fig., 1961.

Stands of Weisser Delikatess kohlrabi in the experimental field of the Biol. Bundesanstalt, Berlin-Dahlem, Germany, were heavily damaged by *P. lingam* [cf. **34**, 565; **39**, 358] in 1960. Oval spots with blue-green rims appeared on the swollen part of the stem, the centres becoming dry, brittle, and torn, and the tissue up to 0·5–1 cm. underneath grey-black and partially rotten. Similar but more elongated lesions appeared on petioles, whereas the leaf spots were irregular in shape, grey, and clearly defined against the healthy tissue. At harvest most axils were affected and the main root was largely disintegrated. Abundant pycnidia developed on the dead tissue.

Cook (P. P.) & Sylvester (E. S.). **Influence of caging and transferring techniques on aphid mortality.**—*J. econ. Ent.*, **54**, 1, pp. 101–103, 1961.

At Dept Ent., Univ. Calif., Berkeley, none of the methods tested, viz. aluminium-

foiled v. non-foiled leaf cages, leaf v. plant caging, leaf cages with and without nylon net, and mass acquisition in large leaf cages v. plastic tube enclosure, exerted a significantly measurable effect on the capacity of *Myzus persicae* to transmit beet yellow-net virus. Darkening the cages by wrapping with foil neither reduced aphid mortality nor increased beet yellows virus transmission. Of the 2 hosts on which the aphids were reared, viz. smooth leaf mustard (*Brassica juncea*) [**36**, 77] or sugar beet, the former proved definitely more conducive to survival.

BONNEMAISON (L.). **Traitement des semences de Betterave avec des produits endothérapiques aphicides.** [The treatment of Beet seed with endotherapeutic aphicides.] -*Phytiatrie-Phytopharm.*, **9**, 4, pp. 241–258, 8 graphs, 1960.

Experiments at the I.N.R.A., Sta. Centrale de Zoologie Agricole on the control of *Aphis fabae* and *Myzus persicae*, the vectors of beet yellows virus and beet mosaic virus, with various insecticidal seed treatment are described. Disyston (diethylethylthioethyl dithio-phosphate) gave the best results.

JANAS (JANINA) & PAWELSKA (KRYSTYNA). **Żółtaczka wirusowa Buraków (Beta virus 4) w Polsce.** [Beet yellows virus in Poland.]—*Biul. Inst. Ochr. Roś., Poznań, 1960*, 9, pp. 161–170, 2 maps, 1960. [Russ., Engl. summ. 14 ref. Cyclostyled.]

This historical survey of beet yellows in Poland is presented as an annotated bibliography, augmented by records of the Inst. of the Sugar Industry. A high incidence of beet yellows in W. Poland (over 50% in the Poznań and Bydgoszcz regions) in 1959 is attributed to the lack of rain, early appearance of numerous *Aphis fabae*, late sowing, wide spacing of plants, and the presence of many seed crops, which acted as sources of infection.

WIESNER (K.). **Spinnmilben (Tetranychus urticae Koch) und echter Mehltau (Erysiphe communis (Wallr.) Link) an Beta-Rüben im Jahre 1959.** [Red spiders (*T. urticae*) and true mildew (*E. communis*) on *Beta*-Beet in the year 1959.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **14**, 7, pp. 130–133, 1960. [Russ., Engl. summ.]

E. communis [*E. polygoni*: cf. **36**, 803], widespread in Germany under the hot, dry growing conditions of 1959, was found by the Inst. für Pflanzenzüchtung, Kleinwanzleben, to favour beet leaves infected by beet yellows virus. Spraying with 'Netzschwefel Fahlberg' gave very good control.

DRACHOVSKÁ (MIROSLAVA). **Prognosa Řepné cerkosporiosy.** [Prognosis of Beet cercosporiosis.] -*Listy cukr.*, **76**, 4, pp. 76–84, 5 fig., 1 graph, 1960. [36 ref.]

This paper from the Výzkumný ústav cukrovarnický, Modřany, near Prague, Czechoslovakia, analyses the issues to be considered, including the development of the host, the parasite (*Cercospora beticola*) [cf. **40**, 12], and the infection, and the local and climatic conditions. Prognosis should be based on data from particular areas, as the severity of the attack largely depends on such circumstances as site, amount of dew and mist, stand density, presence of other diseases, quantity of weeds, and the character of previous phytosanitary operations. The time factor is important in chemical control; one fungicidal spray is normally sufficient and should be given in the 1st half of Aug. within 5–8 days of the appearance of spots and within 4 days of weather favourable for infection. Table and fodder beet, in which the disease starts earlier than on sugar beet, can be used as indicators. Control based on a correct prognosis is believed to reduce losses by 2/3.

LABRUYÈRE (R. E.), DEN OUDEN (H.), & SEINHORST (J. W.). **Experiments on the interaction of Hoplolaimus uniformis and Fusarium oxysporum f. pisi race 3**

and its importance in 'early yellowing' of Peas.—*Nematologica*, **4**, pp. 336–343, 4 pl., 1959. (*Meded. Inst. plziektk. Onderz., Wageningen* 227.) [Germ. summ.]

Inoculation experiments confirmed earlier conclusions that neither the nematode nor the fungus separately can cause serious root rot, though their interaction can lead to extensive decay of the cortex, the chief root symptom of early yellowing [**39**, 72].

YARWOOD (C. E.). **Uredospore production by Uromyces phaseoli.**—*Phytopathology*, **51**, 1, pp. 22–27, 8 graphs, 1961.

An expanded account of experiments with *U. appendiculatus* on *Phaseolus vulgaris* already noticed [**40**, 258].

SWENSON (K. G.) & SOHI (S. S.). **Factors determining the rate of Bean yellow mosaic virus transmission by the aphid Myzus persicae.**—Abs. in *Phytopathology*, **51**, 1, p. 67, 1961.

Among the factors contributing to variation in transmission were the nutritional status of the test plants (broad bean), temp. (susceptibility increasing with a reduction in the range 18–27° C. [cf. **40**, 257]), and age of host plant (Chinese cabbage) on which aphids were kept.

SWAMY (R. N.). **Gaseous emanation from Groundnut infected by Cercospora personata (Berk et Curt.) Ell. et Everh.**—*Phytopath. Z.*, **40**, 3, pp. 245–247, 1 fig., 1961. [Germ. summ.]

The leaf yellowing followed by abscission caused by heavy infection of groundnut by *C. personata* [*Mycosphaerella berkeleyi*: cf. **38**, 643] is reminiscent of certain other diseases associated with the production of volatile substances [**29**, 465]. At Univ. Bot. Lab., Madras, 3 vigorously growing Bonny Best tomato plants were enclosed under air-tight bell jars, 1 with about 12 heavily infected groundnut leaves, the petioles in water, the 2nd with the same number of uninfected leaves, and the 3rd without any leaves. After about 36 hours at 20° C. the 1st plant had developed epinasty of the lowest 2 leaves, whereas the others were unaffected, thus demonstrating production of active emanations from the infected leaves. The volatile substance has not been identified, but the author suggests ethylene, the only unsaturated hydrocarbon known to be produced by plant tissue [cf. **33**, 507].

KLINGNER (A.) & PONTIS-VIDELA (R. E.). **Pink root disease of Onions in Mendoza, Argentina.**—*Plant Dis. Reptr*, **45**, 3, p. 235, 1961.

During 1959–60 and 1960–1, onions growing in the province of Mendoza, Argentina, were affected by *Pyrenochaeta terrestris* [cf. **39**, 141], a new record for the country.

SERPA (L. Q.). **Efectividad de cuatro fungicidas en el control de la 'quemazón de las hojas' en Cebolla (Allium cepa), causada por Alternaria porri.** [Effectiveness of four fungicides in the control of 'leaf scorch' of Onion, caused by *A. porri*.]—*Rev. Fac. nac. Agron., Medellin*, **20**, 54, pp. 76–79, 1960.

Manzate, parzate, dithane Z-78, and oxicob, in that order, were found effective in the control of *A. porri* [**20**, 100] on onion.

TACHIBANA (H.) & DURAN (R.). **Pathogenicity of monosporic versus polysporic cultures of Urocystis colchici.**—Abs. in *Phytopathology*, **51**, 1, p. 67, 1961.

Evidence for heterothallism in *U. cepulae* was obtained when 95 of 100 cultures from single teleutospores produced no infection on onion. Pathogenic combinations were obtained by pairing suitable monosporic isolates.

Jenkins (S. F.) & Winstead (N. N.). **Observations on the sexual stage of Colletotrichum orbiculare.**—*Science*, **133**, 3452, pp. 581–582, 1961.

An isolate of *C. orbiculare* (syn. *C. lagenarium*) [cf. **10**, 771; **32**, 465] race 1 from edible gourd (*Lagenaria leucantha* var. *longissima*) formed perithecia in culture at State Coll., Raleigh, N. Carol., and was identified as *Glomerella* sp. It produced very few ascospores when selfed but very many when mated with certain other isolates of the same sp. The exact taxonomic relationships of these have not yet been established.

Bohn (G. H.) & Whitaker (T. W.). **A new host for the cucurbit powdery mildew fungus.**—*Plant Dis. Reptr*, **45**, 3, pp. 232–234, 1961.

In a greenhouse at the U.S. Dept Agric., La Jolla, Calif., 2 plants of *Eremocarpus setigerus* developed powdery mildew when growing among cantaloupes which had been inoculated with *Erysiphe cichoracearum*. The powdery mildew from this non-cucurbitaceous weed was successfully transferred to cantaloupe seedlings in the laboratory.

Urayama (T.). **Stimulative effect of certain specific bacteria upon mycelial growth and fruit body formation of Agaricus bisporus (Lange) Sing.**—*Bot. Mag. Tokyo*, **74**, pp. 56–59, 5 fig., 1961.

At Dept Biol., Miyazaki Univ., Japan, mycelial density in mushroom cultures on horse manure in flasks and pots was increased, and initiation of fruiting took place earlier, following the application of suspensions of *Bacillus psilocybe*.

'Panel' sulle virosi della Vite, Voghera (Pavia), 15 Ottobre 1960. ['Panel' on virus diseases of the Vine, Voghera (Pavia), 15 Oct. 1960.]—*Notiz. Malatt. Piante* 55 (N.S. 34), 102 pp., 9 pl., 1 fig., 1961.

Following an introduction, these papers were presented.

D. Rui [Importance of an exact discrimination between symptomatological features common to infectious degeneration and boron deficiency.] (pp. 11–18). Attention is drawn to the frequency in Italy of morbid conditions of the vine due to B deficiency, some of the symptoms of which [cf. **36**, 167] resemble those of infectious degeneration [**40**, 451].

G. Borzini & J. C. Scurti [Infectious degeneration of the Vine in Piedmont. The results of preliminary investigations and the orientation of the studies in progress.] (pp. 19–27; Engl. summ.). Work, mainly on Barbera vines, confirmed the influence of the rootstock on the development of symptoms and the importance of correct fertilizer applications, particularly B.

M. Salerno [Observations and experiments on 'infectious yellows' of the Vine in E. Sicily.] (pp. 29–42). The symptoms [cf. **39**, 149] as they appear in the Etna region are described; the condition was transmitted by chip-budding and grafting.

J. C. Scurti [Spectrophotometric examination of Vines affected by infectious degeneration.] (pp. 49–51; Engl. summ.). Preparations rich in nucleic acids were obtained from leaves of healthy vines and from those with infectious degeneration; Beckman U.V. examination showed absorption spectra corresponding more or less to pure nucleic acids. There was a great difference between the nucleic acid content of healthy and affected leaves, the latter showing greater absorption at 258 mμ, especially in the fraction dissolved in neutral salts, and occasionally in alkaline solutions.

U. Prota [Infectious degeneration of 'Cannonau' Vines. Part II. The appearance, succession, and repetition of the symptoms. The yield of affected Vines.] (pp. 53–66). Further studies [cf. **40**, 451] showed a certain regularity in the order

in which the symptoms appear during the year. Yields varied greatly from year to year.

M. SALERNO [Contribution to the study of 'infectious degneration' of the Vine in Sicily. II. The frequency of occurrence of macroscopic symptoms of the disease on some of the most important cultivars grown in the Etna area.] (pp. 69–87; Engl. summ.). Further observations [cf. **39**, 259] in 1958–9 showed that only a few symptoms occur with sufficient frequency to be used for field identification of the disease.

A. C. GIUSSANI [Field observations on the distribution and the symptomatology of infectious degeneration of the Vine in Friuli.] (pp. 95–98). The disease is prevalent and a potential threat to the area, but is not virulent enough to render a vineyard unproductive within a few years. The symptoms noted are listed.

A. GRANITI & A. CICCARONE [Observations on virus and virus-like symptoms on Vine in Apulia.] (pp. 99–102). 'Enation disease' [**38**, 648], leaf roll virus (found locally in 1960), and a rapid wilt ('legno riccio'), accompanied by long, prominent cordons on the inner surface of the bark corresponding with grooves on the outer surface, are described; only grafted vines are affected.

OCHS (GERTRUD). **Übertragungsversuche von drei Rebviren durch Milben und Insekten.** [Experiments in the transmission of three viruses of Vine by mites and insects.]—*Z. angew. Zool.*, **47**, 4, pp. 485–491, 1960. [Engl. summ.]

It was shown experimentally that *Eriophyes vitis*, *Doralis* [*Aphis*] *fabae*, *Myzus persicae*, *Phylloxera vastatrix*, and *Otiorrhynchus sulcatus* and its larvae can transmit vine 'panachure' virus [**37**, 754; **40**, 199] from infected to healthy vine stocks. *M. persicae* also transmitted yellow mosaic virus. None of these vectors transmitted fanleaf virus [cf. **40**, 263].

RUZAEV (K. S.). Борьба с вредителями и болезнями Виноградной лозы. [The control of pests and diseases of Vine.]—*Ex* Книга Виноградаря [The book of the viticulturist], pp. 337–364, 6 fig., Moscow, Sel'khozgiz, 1959.

Symptoms and control of the main fungus pathogens are described, including: *Plasmopara viticola*, the most serious disease, everywhere except in Central Asia; *Uncinula necator* in almost all vine-growing areas, but especially widespread in the Crimea, the southern regions of the Krasnodar area, in Transcaucasia, and especially in the Central Asian Republics; *Coniothyrium* [*Coniella*] *diplodiella* [map 335] in Transcaucasia, the Krasnodar and Stavropol areas, the Rostov region, and the Ukraine; and *Gloeosporium ampelophagum* [*Elsinoe ampelina*: map 234] in the S.W. regions of the Krasnodar area, in Transcaucasia, and especially in the Central Asian Republics; also spotted necrosis, a physiological disease [**38**, 379], control of which is especially important in the Rostov region, the Krasnodar and Stavropol areas, as well as in Moldavia and the Ukraine.

SALERNO (M.) & LA MALFA (G.). **Osservazione sulla differenziazione e germinabilità di 'oospore' di Plasmopara viticola in alcune zone della Sicilia.** [Observations on the differentiation and germinability of the oospores of *P. viticola* in some parts of Sicily.]—Reprinted from *Tecn. agric.*, **12**, 2, 8 pp., 1960.

Studies at Univ. Catania, in the region of Milazzo, and at various places in the vicinity of Mt Etna during 1958–9 showed that the number of oospores formed locally can be very high and that in the Milazzo area differentiation takes place from 5–20 Aug., several days before the earliest date noted by Zappala [**36**, 448]. The life-cycle of *P. viticola*, in many parts of Sicily at least, appears to be very similar to that in other (even northern) parts of Europe.

AUTHORS' NAMES

SUBJECT INDEX